

FINAL REPORT  
MISHONGNOVI WELL  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-799  
PUBLIC LAW 86-121

COMPILED BY:

Curt Harkin

RECOMMENDED BY:

Karen S. Clevinger  
Director, SFC Program

APPROVED BY:

Cheryl L. Goff  
Director OEHE

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE  
PHOENIX AREA OFFICE

APRIL 2004



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FINAL REPORT  
MISHONGNOVI  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

## INTRODUCTION

The Hopi Tribe, in January 1993 and on behalf of the residents of the Hopi Indian Reservation, requested assistance from the Indian Health Service (IHS) to construct a new well for the community of Mishongnovi. The IHS, through Public Law 86-121, contributed funds for the project. Engineering and technical supervision were provided by the IHS and construction was performed by contract and force account.

IHS Project PH 93-779 provided for the construction of a water well in Mishongnovi to serve 240 homes in Mishongnovi and Sipaulovi on Second Mesa, Hopi Indian Reservation. The total cost of the project was \$200,000. the sanitation facilities and responsibility for operation and maintenance (O&M) were transferred to the Tribe in November 2003.

## GENERAL

The Hopi Indian Reservation is located approximately 200 miles north of Phoenix, Arizona, and is surrounded by the Navajo Reservation. The majority of the 10,000 Hopi residents live on or near three mesas on the Reservation (First, Second and Third Mesa).

## PROJECT HISTORY

The Hopi Tribe requested assistance from IHS on January 22, 1993, to aid the Tribe in constructing a new water source with a pump, controls and connection to the Village of Mishongnovi water system. It was noted that the village had no reliable water source at that time. The IHS approved a Project Summary for Project PH 93-779 in July 1993, proposing the development of a new well for the Lower Mishongnovi and Lower Sipaulovi area.

A Memorandum of Agreement (MOA) between the Village of Mishongnovi, the Tribe and IHS was approved in September 1993. In the MOA, the IHS agreed to provide technical assistance with contract administration; the Village and Tribe agreed to provide the land and rights-of-way necessary for well construction, and to accept transfer of the completed facilities.

A cultural resources inventory was completed in February 1994 and submitted to the Arizona State Historic Preservation Officer (SHPO). The survey covered the well site area, which included the pumphouse,

and a short water line extension in Mishongnovi. There were no cultural materials and no traditional cultural properties or sacred areas discovered during the survey. The SHPO agreed with the survey's conclusion.

A contract for the construction of the well was approved in February 1994 and construction on the project began at that time. The well drilling and development was completed in June 1994.

In September 1994, Four Corners Pre-Cast, Incorporated, was awarded the contract for the construction of the pumphouse in Mishongnovi. Amendment No. 1 to the Memorandum of Agreement was approved in December 1994 to provide for Tribal Force Account Construction on the project in accordance with a Memorandum of Understanding between the Tribe and IHS. Construction on the pumphouse was completed in April 1995.

All construction on the project was completed in April 1997 and all IHS vested interest in the project was transferred to the Tribe in November 2003.

#### PROJECT CONSTRUCTION EXPERIENCE

No unusual construction problems were experienced during the project.

TABLE I - CHRONOLOGY OF EVENTS

<u>Activity:</u>	<u>Date:</u>
Project Proposal Submitted	January 1993
Project Summary Approved	July 1993
MOA Signed	September 1993
Project Started	February 1994
Project Completed	April 1997
Transfer Approved	November 2003

#### SUMMARY OF FACILITIES PROVIDED

Water: Project PH 93-779 funded the construction of a new community water well. The well is 900 feet deep with 590 feet of 8-5/8" casing, 8-inch pitless unit, a 20 HP pump and appurtenances. A pumphouse was also constructed near the well with chlorinating and fluoridating systems, water meter and a pressure/flow switch. To protect the pumphouse, 100 feet of chain link fencing was constructed around the facility.

Approximately 100 feet of 8-inch PVC pipe with one 8-inch gate valve, one 2-inch gate valve, one 2-inch blow-off valve and one interconnection was constructed to connect the new well to the Mishongnovi water system.

TABLE II - PROJECT COST SUMMARY

FUNDS ALLOCATED

EXPENDITURES

<u>Description</u>	<u>Amount</u>	<u>Description</u>	<u>Amount</u>	<u>% of Total</u>
IHS	\$200,000	Well & appurtenances	\$131,281	65.6
		Pumphouse	33,425	16.7
		Fencing	5,040	2.5
		Water main & appurt.	10,500	5.3
		Miscellaneous	19,754	9.9
		Total	\$200,000	100.0%

CONTRIBUTIONS

Tribal force account construction crews and contractors constructed all sanitation facilities provided under the project.

TRAINING

The IHS engineer and District Utility Consultant provided training for the Tribe on the operation and maintenance of the water facilities.

OPERATION AND MAINTENANCE (O&M)

Upon completion of the project, O&M of all facilities constructed became the responsibility of the Tribe.

TRANSFER OF FACILITIES

The Phoenix Area Director signed a letter transferring all IHS vested interest in the sanitation facilities constructed under Project PH 93-779 to the Tribe in November 2003.

# ***Transfer Document***



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Phoenix Area Indian Health Service  
Two Renaissance Square  
40 North Central Avenue  
Phoenix, Arizona 85004

NOV 13 2003

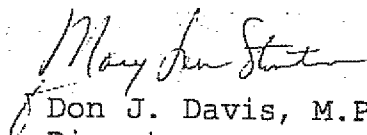
Mr. Wayne Taylor, Sr.  
Chairman, The Hopi Tribe  
P.O. Box 123  
Kykotsmovi, Arizona 86039

Dear Chairman Taylor:

This is to inform you that the Indian Health Service (IHS) has fulfilled its obligations in regards to IHS Project PH 93-779. The project provided for the installation of water facilities for the Village of Mishongnovi on the Hopi Indian Reservation (see enclosure).

This letter serves as notice that the IHS hereby transfers all vested interest in the sanitation facilities constructed under Project PH 93-779 to the Tribe. A final report on the project will be developed by the IHS and a copy will be sent to the Tribe.

Sincerely,

  
Don J. Davis, M.P.H.  
Director

Enclosure

cc:  
District Engineer, EADO  
Director, DSFC

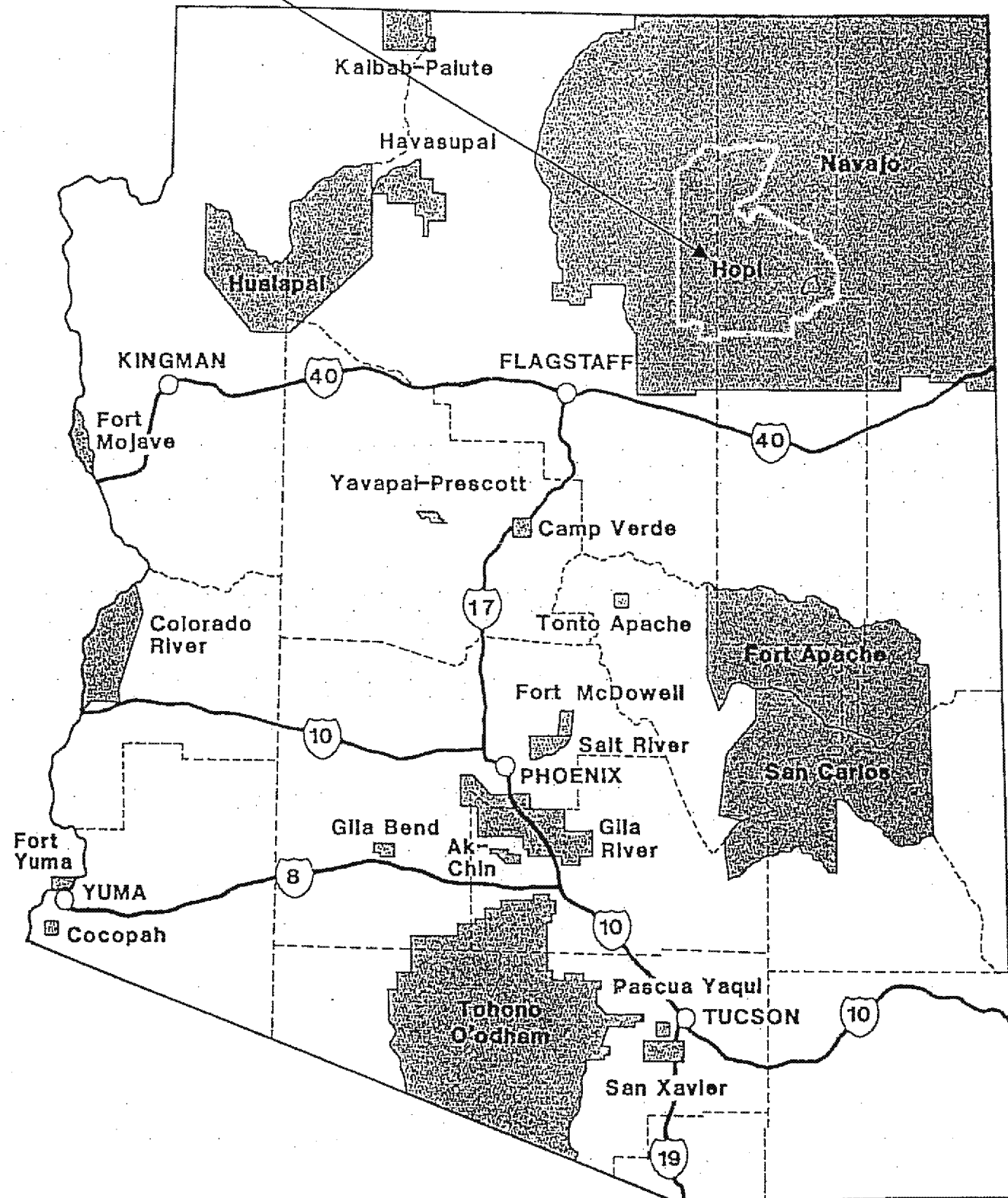


ENCLOSURE  
LIST OF FACILITIES INSTALLED AND RECEIVING AGENCY  
IHS Project PH 93-779

Description of Items to be Transferred	Receiving Agency	
	Village	Homeowner
1. Community well w/590' of 8-5/8" casing, 8" pitless unit, 20 HP pump, 514' of pump cable, 504' of 3" GI drop pipe and two 3" check valves	X	
2. Control building w/chlorine and fluoride systems, water meter, pressure/flow switch and 100' of chainlink fence with gate	X	
3. 100' of 8" PVC water main with one 8" gate valve, one 2" gate valve and one 2" blow-off valve.	X	

# ***Location Map***

# PROJECT LOCATION



## INDIAN RESERVATIONS IN ARIZONA

# *Engineering Reports*

PROJECT SUMMARY  
MISHONGNOVI WELL  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE  
PHOENIX AREA OFFICE

JULY 1993

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PROJECT SUMMARY  
MISHONGNOVI WELL  
HOPI INDIAN RESERVATION  
NAVAJO COUNTY, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

DATE OF SUMMARY:  
July 1993

INTRODUCTION

The Hopi Indian Tribe submitted a Project Proposal to the Indian Health Service (IHS) on January 22, 1993, requesting assistance in constructing a new well in Mishongnovi to serve the Villages of Mishongnovi and Sipaulovi. In response to the Project Proposal and because unsafe water supplies and sewage disposal facilities contribute to the high incidence of infectious diseases, the Indian Health Service (IHS), an Agency of the U.S. Public Health Service, has been authorized under Public Law 86-121 to construct sanitation facilities for American Indians and, therefore, will provide for the design and construction of the facilities described in this Project Summary.

This Project Summary contains a preliminary evaluation, recommendations, and cost estimates to construct a new well for the Villages of Mishongnovi and Sipaulovi.

GENERAL INFORMATION

A. Reservation Description

1. Location: The Hopi Indian Reservation is located in eastern Coconino and northern Navajo Counties, Arizona. It encompasses 2,439 square miles and is bounded on all sides by the Navajo Indian Reservation. Most of the Reservation is open land used for livestock grazing. Hopi shrines, sacred natural features, and ceremonial gathering areas are scattered throughout the Reservation.

The Villages of Mishongnovi and Sipaulovi is located on top of Second Mesa with the Toreva area located at the base of the mesa. In addition, there are scattered homes and a housing subdivision located within the lower Mishongnovi and Lower Sipaulovi area surrounding the mesa adjacent to Arizona State Highway 264. Highway 264 passes by the mesa going east and west and it is intersected by State Highway 87 at the Second Mesa junction.

2. Climate: The Reservation is a part of the arid Colorado plateau known as the Black Mesa Basin. The average maximum daily July temperature is 91.8°F and the average

January minimum daily temperature is 17.7°F. Average rainfall is 8-inches per year and the average evaporation is 78-inches per year.

3. Topography and Geology: Elevations range from 4,700 feet in the south to 7,100 feet in the north. The Hopi Mesas are composed mainly of sandstone; the lowlands are composed mainly of a clayey sand soil. Vegetation consists of scrub juniper, yucca, sage, and buffalo grass, with cottonwood trees in some of the washes.

B. Population: There are approximately 1,250 people living in the Mishongnovi and Sipaulovi area. This includes the Lower Mishongnovi and Lower Sipaulovi population. According to the 1992 census, the Indian Population of the Hopi Reservation is 9,556 people.

C. Housing and Public Facilities: There are approximately 240 houses on Second Mesa in the Villages of Mishongnovi and Sipaulovi including approximately 100 houses in the lower village areas. Community facilities include a BIA school compound which is located below Second Mesa and is one mile south of the villages of Mishongnovi and Sipaulovi.

The BIA Hopi Agency headquarters and IHS hospital are located in Keams Canyon. Holbrook is the nearest off-reservation city and is located 65 miles south of Keams Canyon. Other Reservation border towns include Winslow and Flagstaff. Mishongnovi is located approximately 20 miles west of Keams Canyon.

D. Government: There are two forms of Tribal government on the Reservation, traditional and democratic. In the traditional form, Mishongnovi Village is a complete and independent government with the village Bear Clan "Mongwi" serving as leader. Decisions are based upon consensus.

A Tribal Council composed of 22 representatives from the nine population centers embodies the democratic form of government on the Reservation. The Tribal government, located in Kykotsmovi, recognizes village authority. It acts to form closer ties between the villages and serves as a focal point for outside Tribal contacts.

E. Economy: Federally funded programs (BIA and IHS) and the Hopi Tribal Government are the principal employers on the Reservation. This represents approximately 75% of the employment. Private sector employment such as service stations, motel and restaurants, arts and crafts shops, and other service businesses accounts for approximately 25% of the employment sector.



Other economic activity includes cattle and sheep production, tourism, royalties from coal mining, and construction. Most of the arts and crafts come in the form of fine Hopi overlay jewelry, hand woven baskets, free-hand formed pottery, and fine hand-carved kachina dolls, which are sold to tourists.

#### DISEASES OF ENVIRONMENTAL SIGNIFICANCE

The Keams Canyon Service Unit has seen and treated area residents for gastroenteritis, shigella, hepatitis, and other environmentally related diseases. Specific disease rate data are not readily available.

#### EXISTING SANITATION FACILITIES

- A. Water Supply: The water source for the villages of Mishongnovi and Sipaulovi is a community well drilled 1,442 feet deep with a top casing elevation of 6,181 feet and a water-level elevation of 5,402 feet. It produces 16 gpm. Water from the well is pumped to a 16,000 gallon water storage tank and an 80 gallon hydropneumatic tank. The water system consists of two pressure zones which feed eight watering points spread throughout the two communities and provide potable water for approximately 100 households.

The water source for Lower Mishongnovi and Lower Sipaulovi is a well located near the base of Second Mesa. The well was drilled to a depth of 1,033 feet and produces 90 gpm. It has an approximate ground and water level elevation of 5,775 feet and 5,472 feet, respectively and supplies water to a 75,000 gallon water storage tank. Approximately 100 homes are served by the system. There is a need for a backup well for this system which would also provide a water source for five homes in the Sunlight area.

Two BIA wells serve the area's BIA school and the Toreva area. Well #1 was drilled to a depth of 800 feet with a top of casing elevation of 5,685 feet and a water-level elevation of approximately 5,390 feet. The well produces 55 gpm and feeds water to a 10,000 gallon underground concrete tank located at Toreva. Well #2 is 1,090 feet deep with an approximate ground and water-level elevation of 5,785 feet and 5,406 feet, respectively. Well #2 produces 40 gpm and feeds a 30,000 gallon steel water storage tank.

- B. Wastewater Disposal: Sewage generated in the villages of Mishongnovi and Sipaulovi is disposed of in a 0.52 acre, two cell lagoon. In addition to serving the two communities, the lagoon also serves the Toreva area. The Lower Mishongnovi and Lower Sipaulovi area is served by two lagoons. One of the lagoons primarily serves the BIA school and the other serves the Sekakuku Store and the Lower Mishongnovi and Lower

Sipaulovi subdivision. Homes in Lower Mishongnovi and Lower Sipaulovi that are not located in the subdivision have septic tanks and drainfield systems for wastewater disposal.

- C. Solid Waste Disposal: The Tribe, in conjunction with the IHS and a HUD Community Development Block Grant, developed a Reservation wide solid waste program. The landfill is designed to RCRA specifications and began operation in May 1993.

#### RECOMMENDED FACILITIES

- A. Water Supply: A new water well for the Lower Mishongnovi and Lower Sipaulovi area is proposed. The well will be approximately 950 feet deep with 8-inch casing and will be fully developed to produce approximately 90 gpm. A new pump, pitless unit, pumphouse, electrical controls, and water main interconnection are also proposed. In addition, five homes in the Sunlight area will be served under the project with a watering point near the new well. The watering point will provide potable water for these homes.

#### ESTIMATED COST OF RECOMMENDED FACILITIES

A. <u>WATER SUPPLY</u>		Unit	Total
	Quantity	Cost	Cost
1. Well	1,000 LF	\$90	\$ 90,000
2. Pump	2 EA	\$5,000	10,000
3. Drop pipe	600 LF	\$6	3,600
4. Cable	650 LF	\$6	3,900
5. Pitless unit	1 EA	\$2,000	2,000
6. Three phase power	1 JOB	LS	12,500
7. Pumphouse	1 JOB	LS	25,000
8. Chemical feed system	1 JOB	LS	6,000
9. Controls	1 JOB	LS	10,000
10. PVC, 8-inch	500 LF	\$15	7,500
11. Gate valves, 8-inch	2 EA	\$750	1,500
12. Connection w/hydrant	1 JOB	LS	1,500
Subtotal			\$173,500
+15% Contingencies			26,025
TOTAL			\$199,525
ROUNDED TO NEAREST THOUSAND			\$200,000

Cost per home = \$200,000 ÷ 100\* = \$2,000

\*Total number of homes in Lower Mishongnovi and Lower Sipaulovi.

#### CONTRIBUTIONS

The IHS will provide at no cost to the Hopi Tribe or to the Village of Mishongnovi a new fully developed well and associated main lines to produce potable water for the villages of Mishongnovi and Sipaulovi.

## **PARTICIPANTS**

The Hopi Tribe, the Village of Mishongnovi, and the residents of Mishongnovi, Sipaulovi and Sunlight Mission will be served by the project. The new well will provide potable water for all individual of the Lower Mishongnovi and Lower Sipaulovi communities under this project.

## **METHOD OF CONSTRUCTION**

The proposed well drilling, development and pump installation will be provided under a government contract. Other facilities will be installed by an IHS force account crew which is based in Bacavi, Arizona, 15 miles from the proposed work site. Technical supervision will be provided by the IHS Phoenix Area engineering staff stationed in Keams Canyon, Arizona.

All archaeological, historical, and cultural clearances and rights-of-ways will be obtained by the IHS with the assistance of the Tribe and the Village of Mishongnovi.

## **FLOOD HAZARD**

The proposed well and pumphouse will not be located in areas subject to flooding. None of the facilities will be built in flood prone areas without provision of flood protection features.

## **OPERATION AND MAINTENANCE**

Ownership of all proposed community facilities will be transferred to the Village of Mishongnovi. The community association charged with O&M of the Mishongnovi water distribution system will be solely responsible for all aspects of O&M of the new well and pumphouse which will be incorporated into their existing water system.

The Village of Mishongnovi has an established water and sewer committee which charges all water users a monthly fee. The village assumes full responsibility for maintenance of its distribution system. Village leaders have stated their understanding of the increased responsibilities entailed in obtaining a well and pumphouse and their acceptance of the additional responsibilities.

Sanitation facilities are to be operated and maintained by the community association. In order to promote effective O&M procedures, the IHS will assist the association by:

- a. Drafting of appropriate utility regulatory and operational ordinances;
- b. Recommending appropriate utilities user charges;

- c. Training personnel in the proper O&M procedures of the utilities; and
- d. Developing a realistic utilities O&M budget including capital fund appropriations for system component repair and replacement.

The IHS will also provide O&M information including wall charts, schematics and instruction on the use, maintenance, operation and repair of the facilities. The responsibility for O&M of the transferred facilities will be solely that of the community association and its members. They will pass and enforce the necessary ordinances to regulate the proposed utility systems, operate and maintain the systems, collect sufficient user fees to make the system self-supporting, and select individuals capable and willing to be trained to operate and maintain the systems.

#### O&M COST ESTIMATE

##### Community System - Water

$$\frac{100 \text{ homes} \times 5 \text{ people/home} \times 70 \text{ GPCD}}{(24 \text{ Hours/Day}) \times (60 \text{ Min/Hr})} = 25 \text{ gpm}$$

Using an average system TDH = 450 Feet

$$\text{Electrical cost} = \frac{(25 \text{ gpm}) (450 \text{ ft.})}{3,960 \times 0.75} \times (0.746 \text{ KW}) \times \frac{\$0.13}{\text{KWH}}$$

	= \$ 0.37/HR
	= 0.37 x 24 HR x 365 DAYS
Electrical Cost	= \$ 3,218/YR
Storage tank repair	= 500/YR
Water sampling	= 1,000/YR
Chemicals	= 800/YR
Well pump replacement (deprec.)	= 1,000/YR
Operator time (based on a part-time position at 500 hrs./yr.)	= 5,100/YR
Operator training	= 500/YR
Miscellaneous	= 1,500/YR
Estimated O&M Cost Per Year	= \$13,618

$$\text{Individual Cost for Water/Month} = \frac{\$13,618/\text{YR}}{12 \text{ mn} \times 105 \text{ houses}} = \$10.80/\text{mn}/\text{house}$$

#### ENVIRONMENTAL ASSESSMENT

An Environmental Review and Documentation checklist have been completed for the community distribution system. The need for an environmental assessment is not anticipated. However, informal consultation with U.S. Fish & Wildlife will determine if impacts to endangered species according to the Endangered Species Act

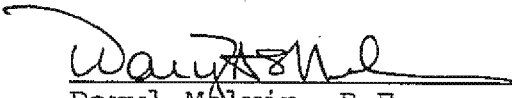
will occur. In addition, cultural resource surveys will be conducted on the community distribution system to comply with the requirements of the National Historic Preservation Act. IHS policy is to avoid impacting cultural resources if at all possible.

PROJECT SUMMARY  
MISHONGNOVI WELL  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

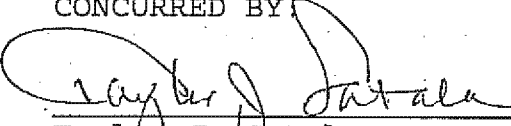
PREPARED BY:

7/7/93  
Date

  
Daryl Melvin, P.E.  
Project Engineer

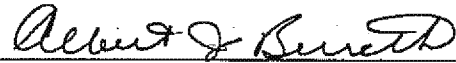
CONCURRED BY:

July 7, 1993  
Date

  
Taylor J. Satala  
Service Unit Director

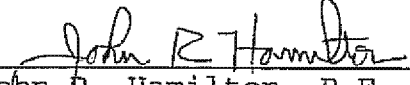
REVIEWED BY:

7/8/93  
Date

  
Albert J. Berreth, P.E.  
District Engineer

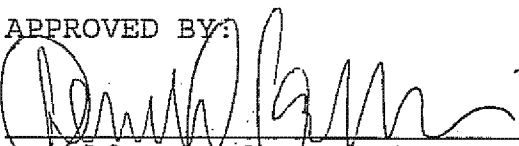
RECOMMENDED FOR APPROVAL:

7/13/93  
Date

  
John R. Hamilton, P.E.  
Director  
Division of Sanitation Facilities  
Construction

APPROVED BY:

7/14/93  
Date

  
Donald B. Bad Moccasin, P.E.  
Associate Director  
Office of Environmental Health and  
Engineering  
Phoenix Area Indian Health Service

# PROJECT SUMMARY REVIEW

Assigned Project No. PH 93-779

Area Phoenix Reservation Hopi  
 Title Mishongnovi Well Tribe Hopi  
 County Navajo and Coconino State Arizona

Prepared by D. Melvin Dated 6/93 Reviewed by A. Berreth Date 6/93  
 =====

1. Introduction	<u>X</u>	11. Type Homes	Cost	Cost/Home
		Initial:		
2. General Information	<u>X</u>	Exist	<u>100</u>	<u>200,000</u>
Location Map	<u>X</u>	HUD		
3. Diseases of Env. San.		HIP		
Significance	<u>X</u>	Other		
4. Existing Sanitation		Initial:		
Facilities	<u>X</u>	Total		
5. Recommended Sanitation		Design:		
Facilities	<u>X</u>	Total	<u>105</u>	<u>200,000</u>
6. Participation	<u>X</u>			<u>1,905</u>
7. Signatures	<u>X</u>	12. Number of Homes Serviced by Type of		
8. Design Analysis	<u>X</u>	Facility:		
Forms		CW	<u>100</u>	CS <u>          </u> CR <u>          </u>
9. Flood Evaluation	<u>X</u>	IW		IS <u>          </u> IR <u>          </u>
		Other		
10. Estimated Cost:				
IHS	<u>\$200,000</u>			
Tribe	<u>          </u>			
LHA	<u>          </u>			
Other*	<u>          </u>			
Total	<u>\$200,000</u>			

Specify Source Approved

INDIAN HEALTH SERVICE  
SANITATION FACILITIES CONSTRUCTION  
UNDER PL 86-121

PROJECT SCHEDULE

AREA Phoenix

PROJECT TITLE Mishongnovi Well PROJECT NUMBER PH 93-779

AND \_\_\_\_\_ PROJECT DESCRIPTION \_\_\_\_\_

LOCATION Hopi Indian Reservation Mishongnovi water source.

ESTIMATED COST \$ 200,000

IHS \$200,000

TRIBAL \$ \_\_\_\_\_

OTHER \$ \_\_\_\_\_ NO. HOMES TO BE SERVED 100

TOTAL \$200,000 DATE PROJECT APPROVED \_\_\_\_\_

ACTION TAKEN	TARGET DATES	REMARKS
MEMORANDUM OF AGREEMENT SIGNED	<u>8/93</u>	_____
ENGINEERING DESIGN INITIATED	<u>8/93</u>	_____
ENGINEERING DESIGN COMPLETED	<u>9/93</u>	_____
ADEQ REVIEW	<u>9/93</u>	_____
RIGHTS OF WAY REQUESTED	<u>9/93</u>	_____
PROCUREMENT INITIATED	<u>10/93</u>	_____
CONSTRUCTION PERSONNEL	<u>10/93</u>	_____
RECRUITMENT	<u>10/93</u>	_____
TRAINING	<u>12/93</u>	_____
CONSTRUCTION COMPLETED	<u>1/94</u>	_____
FACILITIES TRANSFERRED	<u>5/94</u>	_____

John R. Hamilton  
Director, Division of Sanitation Facilities  
Construction

7/13/93  
Date



EXHIBIT 5 NEW PROJECT OR MODIFIED PROJECT APPROVAL FORMPHOENIX AREA INDIAN HEALTH SERVICE SANITATION FACILITIES PROJECT

<u>Assigned Project Number</u>	<u>Project Title and Date</u>	<u>Total Project Estimated Cost</u>
PH 93-779	Hopi Mishongnovi  June, 1993	IHS \$200,000.00 Tribal \$ L.H.A. \$ Other \$ TOTAL \$200,000.00

Under and pursuant to Public Law 86-121 and the authority delegated to me, I hereby approve the sanitation facilities project or modified project outlined in the attached project summary or amended project summary described above.

This Action: XX Approves a new Sanitation Facilities Construction project  
 \_\_\_\_\_ Approves an Amendment to a previously approved project  
 \_\_\_\_\_ Increases the Cost Estimated of a previously approved project.

Negotiation of necessary agreements or agreement amendments related to project execution, contributions, and responsibilities for operation and maintenance of the planned facilities may now be initiated. Negotiations shall be based upon the project summary or amended project summary as approved. Indian Health Service commitments shall not exceed the estimated set forth above.

The assigned project number shall be utilized on all correspondence and documents related to this project.

Daryl Melvin is hereby designated as Project Officer and shall be responsible for the coordination of all activities related to the execution of the project.

Upon receipt of a "Request for Transfer of Funds Between Public Law 86-121 Project Accounts" from the Area Office of Environmental Health and Engineering, the Area Financial Management Officer is hereby instructed to establish a new project account if necessary and to transfer into such account or previously established account an amount equal to the estimated cost set forth above less amounts previously transferred. Obligations and expenditures related to the project are to be charged to this amount.

Fund Certifications:

Date: 6/21/93  
 Funds in the amount of the IHS Acting estimated cost less amounts previously transferred to this project are available in the Area and reserved for this Project.

Daryl Z. Ryan  
 Area Financial Management Officer

Approval Recommended:

Samuel K. Bradsher 6/17/93  
 Director, Division of Sanitation Facilities Construction Date

Concurrence:

Daryl Z. Ryan 6/18/93  
 Associate Director, Office of Environmental Health Date  
Daryl Z. Ryan 6/21/93  
 Director, Phoenix Area Indian Health Service Date

cc: Service Unit Director  
 Dir., IHS, ATTN: Dir., OEH  
 Area Financial Mgmt Officer

# ***APPENDIX***

DEPARTMENT OF  
HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE

FORM APPROVED  
O.M.B. NO. 0915-0018  
EXPIRES 4/30/87  
(See reverse for instructions and  
information)

PROJECT PROPOSAL FOR PROVISION OF SANITATION FACILITIES (P.L. 86-121)

1. NAME AND ADDRESS OF INDIAN TRIBE OR GROUP

The Hopi Tribe, P.O. Box 123, Kykotsmobi, Arizona 86039

2. DESCRIPTION OF TYPE OF FACILITIES NEEDED

Well Water source, pump/controls, and connection to the village of Mishongnovi water system. Village of Mishongnovi has no reliable water source at the present time.

3. IS THERE A COMPREHENSIVE PLAN FOR IMPROVING SANITATION FOR YOUR RESERVATION OR COMMUNITY

☒ YES ☐ NO

4. IF ITEM 3 IS YES, DOES THE PROPOSED PROJECT FIT INTO THE PLAN

☒ YES ☐ NO

5. IF ITEM 3 IS NO, DOES YOUR TRIBE OR GROUP INTEND TO ADOPT A PLAN

☐ YES ☐ NO

6. COULD YOUR TRIBE OR GROUP MAKE A CONTRIBUTION TOWARD THE PROJECT OF FUNDS

☐ YES ☐ NO LABOR ☒ YES ☐ NO OTHER (Specify)

7. DOES YOUR TRIBE OR GROUP ANTICIPATE THE PROVISION OF FUNDS FROM ANOTHER SOURCE TO COMPLEMENT THE FUNDS REQUESTED FROM THE INDIAN HEALTH SERVICE FOR THE PROPOSED PROJECT

☐ YES ☒ NO

8. IF ITEM 7 IS YES, PLEASE IDENTIFY THE SOURCE OF THE ANTICIPATED ADDITIONAL FUNDS

FEDERAL: ☐ DIA ☐ HUD ☐ EPA ☐ FHA ☐ FmHA  
NON-FEDERAL: ☐ STATE ☐ PRIVATE ☐ OTHER (Specify)

9. DOES YOUR TRIBE OR GROUP HAVE AN OPERATION AND MAINTENANCE ORGANIZATION THAT WILL ASSUME RESPONSIBILITY FOR OPERATION AND MAINTENANCE OF THE SANITARY FACILITIES WHEN COMPLETED. IF ANSWER IS "YES" GO TO ITEM #11

☒ YES ☐ NO

10. ITEM 9 IS NO, WILL YOUR TRIBE OR GROUP BE WILLING TO ASSUME RESPONSIBILITY FOR OPERATION AND MAINTENANCE OF FACILITIES WHEN COMPLETED

☐ YES ☐ NO

11. DOES YOUR TRIBE OR GROUP HAVE LAWS OR REGULATIONS WHICH WILL HELP IN THE MAINTENANCE OF SANITARY FACILITIES THAT WOULD BE ACQUIRED

☒ YES ☐ NO

12. IF ITEM 9 IS NO, WOULD YOUR TRIBE OR GROUP BE WILLING TO ADOPT SUCH REGULATIONS

☐ YES ☐ NO

13. NAME AND ADDRESS OF ORGANIZATION AND OFFICIAL THAT WILL BE DESIGNATED TO REPRESENT YOUR TRIBE OR GROUP IN DEALING WITH THE PUBLIC HEALTH SERVICE

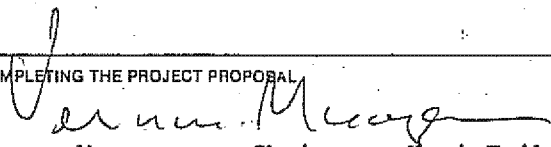
14. REMARKS (include pertinent comments not covered above)

Services requested include community water source, pump controls and main line interconnection for the homes located in Mishongnovi/Sipaulovi.

15. DATE

1-22-93

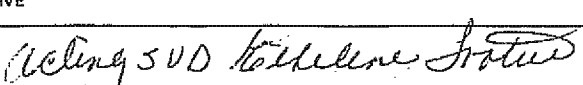
16. SIGNATURE AND TITLE OF PERSON COMPLETING THE PROJECT PROPOSAL

  
Vernon Masayesva, Chairman, Hopi Tribe

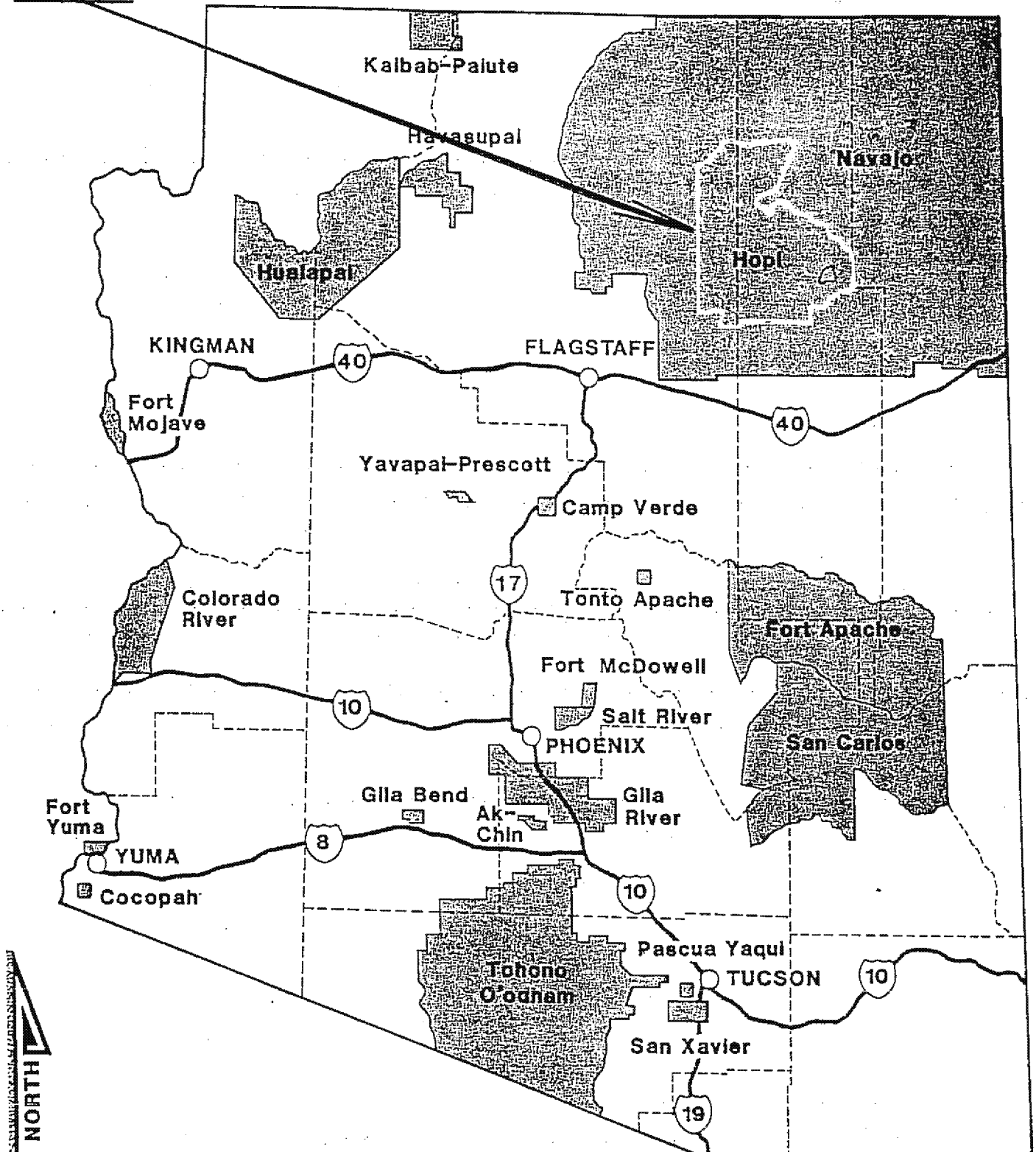
17. TO BE COMPLETED BY PUBLIC HEALTH SERVICE REPRESENTATIVE

FORWARD 3 COPIES OF THIS PROPOSAL TO:

DIRECTOR IN CHARGE

  
Taylor Satala, Service Unit Director  
IHS, Keams Canyon Service Unit  
(Name and Address of Indian Health Facility)

# PROJECT LOCATION



INDIAN RESERVATIONS IN ARIZONA

Prepared By



THE INDIAN DEVELOPMENT DISTRICT OF ARIZONA, INC.

ED\_005149\_00034736-00028

H O P I

MISHONGNOVI  
PROPOSED WELL SITE

I N D I A N

CHECK

Corral

Check  
Dams

EXISTING  
8" PVC

WELL  
SITE

PROPOSED  
8" PVC

Sunlight  
Mission

Shimauou  
Mission

Second  
Mesa

March 6, 1981/DAM

PRELIMINARY DESIGN ANALYSIS  
WATER SUPPLY AND DISTRIBUTION SYSTEM

COMMUNITY/SYSTEM Mishongnovi/Sipaulovi RESERVATION Hopi

INITIAL WATER CONSUMPTION & POPULATION SERVED:

Homes w/Full Facilities	<u>100</u>	X	<u>300</u>	GPD/Home =	<u>30,000</u>	GPD
Homes w/Partial Facilities	<u>0</u>	X	<u>0</u>	GPD/Home =	<u>0</u>	GPD
Homes w/Outside Hyd. Only	<u>0</u>	X	<u>0</u>	GPD/Home =	<u>0</u>	GPD
Non-Residential Use						GPD
Total: <u>100</u> Homes				Total:	<u>30,000</u>	GPD
Population =	<u>5</u>	People/Home X	<u>100</u>	Homes =	<u>500</u>	People
Consumption = Total	<u>30,000</u>	GPD/	<u>500</u>	People =	<u>60</u>	GPCD

DESIGN WATER CONSUMPTION & POPULATION SERVED:

Growth Factor	<u>20</u> %	Design Population	<u>600</u>	Consumption	<u>60</u>	GPCD
Average Daily Total =	<u>600</u>	People X	<u>60</u>	GPCD =	<u>36,000</u>	GPD

WATER SOURCE:

Name	Natural Fl Level	Currently Fluoridated	Currently Chlorinated	Current Pump Yield	Test Yield
Well #1	ppm			90 GPM	GPM
Proposed Well #2	ppm		(est)	90 GPM	GPM
	ppm			GPM	GPM
	ppm			GPM	GPM
	ppm			GPM	GPM
Total Yields:				<u>180</u> GPM	GPM

Initial Pump Cycle =	<u>30,000</u>	GPD/(	<u>180</u>	GPM X	<u>60</u> ) =	<u>2.8</u>	hr/day
Design Pump Cycle =	<u>36,000</u>	GPD/(	<u>180</u>	GPM X	<u>60</u> ) =	<u>3.3</u>	hr/day
Additional Supply Required?	<u>No</u>	Type		Yield			

WATER STORAGE:

<u>23.5</u> ft (D) <u>24</u> ft (H) =	<u>75,000</u> gal;	ft (D) ft (H)	gal
ft (D) ft (H) =	gal;	ft (D) ft (H)	gal
ft (D) ft (H) =	gal;	Total Storage Capacity gal	

Existing Storage Available =	<u>75,000</u>	gal	<u>30,000</u>	GPD =	<u>2.5</u>	days
Design Storage Required =	<u>36,000</u>	GPD X 2 days =	<u>72,000</u>	gal		
Additional Storage Required =	<u>None</u>	gal -	gal =			

INITIAL SYSTEM PRESSURE:

EXISTING

Elevation of High Water Level Tanks	<u>5,799</u> ft	Low Water Level	<u>5,787</u> ft
Elevation of Highest House Served	<u>5,760</u> ft;	Lowest House Served	<u>5,580</u> ft
Max Static Pressure	<u>219</u> ft = <u>95</u> PSI	Min Static Pressure	<u>27</u> ft = <u>12</u> PSI

PROPOSED

Elevation of High Water Level Tanks	<u>5,799</u> ft	Low Water Level	<u>5,787</u> ft
Elevation of Highest House Served	<u>5,860</u> ft;	Lowest House Served	<u>5,580</u> ft
Max Static Pressure	<u>219</u> ft = <u>95</u> PSI	Min Static Pressure	<u>73</u> ft = <u>31</u> PSI

APPENDIX A-3  
ENVIRONMENTAL REVIEW AND DOCUMENTATION

Project Name Mishongnovi Well Project Number 93-779

Any positive response requires the preparation of an Environmental Assessment for the project.

CONSIDERATIONS	DETERMINATION (YES OR NO)	BASIS FOR DETERMINATION AND DOCUMENTATION
1. <u>Wetlands/Water Resources</u> Will the project adversely affect wetlands/water resources or will there be construction in wetlands, except in conformance with a Corps of Engineers Section 404 Permit?	NO	IHS - SR. ENVIRONMENTAL ENGINEER
2. <u>Floodplains Executive Order (11988)</u> Will the project involve construction in a floodplain (except for agency activities excluded as a class) or impact floodplain development?	NO	" " "
3. <u>Endangered Species Act of 1973 as amended</u> Is the project likely to adversely affect a species listed on the Federal list of endangered or threatened species or the category I candidate specific being considered for listing?	NO	" " "
4. <u>Historic Preservation Act of 1966 and Related Acts and Executive Orders</u> Will the project adversely affect properties listed, or eligible for listing, on the National Register of Historic places?	NO	" " "

CONSIDERATIONS	DETERMINATION (YES OR NO)	BASIS FOR DETERMINATION DOCUMENTATION
5. <u>Wild and Scenic Rivers Act</u> Is the project a " <u>Water Resources Project</u> " which will impact a wild, scenic or recreational river area and create conditions inconsistent with the character of the river?	NO	IHS - SR. ENVIRONMENTAL ENGINEER
6. <u>Coastal Zone Management Act</u> Will the project directly affect a Coastal Zone in a manner inconsistent with the Coastal Zone Management Plan?	NO	NO EXISTING COASTAL ZONE
7. <u>Wilderness Act</u> Will the project adversely impact a Wilderness Area?	NO	IHS - SR. ENVIRONMENTAL ENGINEER
8. <u>Farm Land Protection Act</u> Will the project convert significant Agricultural Lands to non-agricultural uses?	NO	"
9. <u>Safe Drinking Water Act</u> Will the project impact a sole source aquifer?	NO	"
10. <u>NEPA</u> Will the project result in a violation or continuance of a violation of applicable (Federal, Tribal, State or local) law or requirements imposed for protection of environment or public health and safety?	NO	"
11. <u>NEPA</u> Is there a controversy with respect to environmental effects of the project based on reasonable and substantial issues?	NO	"



CONSIDERATIONS	DETERMINATION (YES or NO)	BASIS FOR DETERMINATION AND DOCUMENTATION
12. NEPA - Is the project significantly greater in scope than normal projects for the Area or does the project have significant unusual characteristics?	NO	"
13. NEPA - Does the project establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects? (cumulative impact)	NO	"
14. NEPA - Does the project have significant adverse direct or indirect effects on parkland, other public lands, or areas of recognized scenic or recreational value?	NO	"
15. NEPA - Will the project provide for the construction of a sanitary landfill at a new solid waste disposal site?	NO	"
16. NEPA - Will the project include construction of a new wastewater treatment facility with direct discharge of treated sewage to surface waters?	NO	"
17. CERCLA - Does the project involve the use, transfer or lease of real property which has been used as a storage for hazardous waste for more than one year?	NO	"
18. Is an assessment required for other reasons?	NO	"

Chief, SECH  
John R. Hammer  
Area SFC NEPA Coordinator

Date 6/30/93  
Date 5/3/93  
Project Engineer Robert J. Bennett  
District Engineer

4/5/93

00034736-000333



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service  
Indian Health Service  
Office of Environmental Health & Engineering

Eastern Arizona District  
674 White Mountain Blvd.  
P.O. Box 2430  
Pinetop, Arizona 85935

February 22, 1994

*file*

Robert Gasser  
Arizona State Historic Preservation Officer  
800 W. Washington, Suite 415  
Phoenix, Arizona 85007

Re: Cultural Resources Inventory, Project PH 93-779

Dear Mr. Gasser:

Enclosed is a cultural resources inventory for a well site area which includes a pumphouse, and a short waterline extension in the Mishongnovi community on the Hopi Indian Reservation.

Please review the inventory and let me know if we can proceed at your earliest convenience.

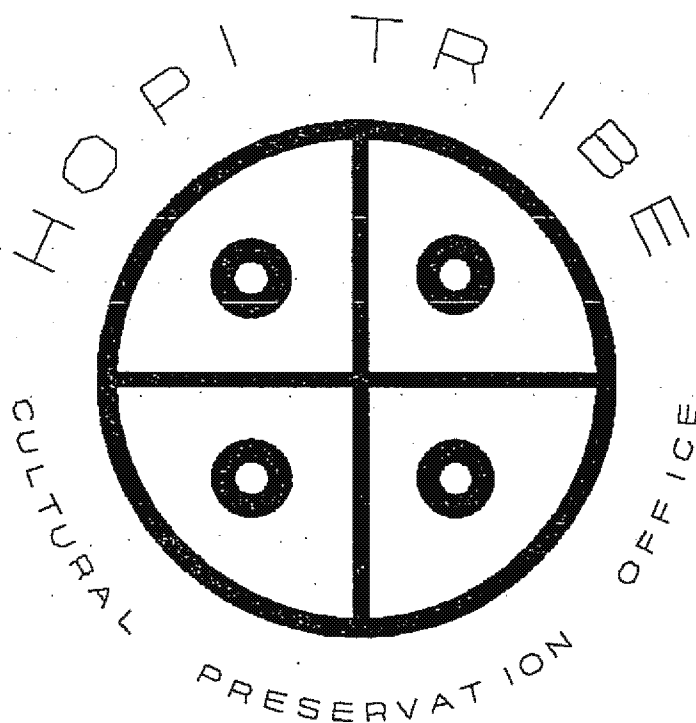
Sincerely,

*Albert J. Berreth*

Albert J. Berreth, P.E.  
District Engineer

cc: John R. Hamilton, Director, DSFC  
Daryl Melvin, Field Engineer  
Attachment: HCPO 93-036  
file: NEPA 779

**A CULTURAL RESOURCE INVENTORY OF ONE PROPOSED WELL  
AND ADJOINING PIPELINE TO BE CONSTRUCTED IN LOWER  
MISHONGNOVI BY THE OFFICE OF ENVIRONMENTAL HEALTH,  
INDIAN HEALTH SERVICE, HOPI INDIAN RESERVATION,  
NAVAJO COUNTY, ARIZONA.**



February 9, 1994

A CULTURAL RESOURCE INVENTORY OF ONE PROPOSED WELL AND  
ADJOINING PIPELINE TO BE CONSTRUCTED IN LOWER MISHONGNOVI  
BY THE OFFICE OF ENVIRONMENTAL HEALTH,  
INDIAN HEALTH SERVICE, HOPI INDIAN RESERVATION,  
NAVAJO COUNTY, ARIZONA.

HCPO 93-036

Prepared by  
Cindy Dongoske, Staff Archaeologist  
Hopi Cultural Preservation Office

Submitted by  
Kurt Dongoske, Project Director  
Hopi Cultural Preservation Office

Reviewed and Approved By  
Leigh Jenkins, Director  
Hopi Cultural Preservation Office

Submitted to  
Mr. Daryl Melvin, P.E., Office of Environmental Health  
Indian Health Service, Keams Canyon PHS Hospital,  
Keams Canyon, Arizona 86034

Prepared for  
Mr. Daryl Melvin, P.E., Office of Environmental Health,  
Indian Health Service, Keams Canyon PHS Hospital,  
Keams Canyon, Arizona 86034

Conducted Under Hopi Tribal Ordinance 26

February 9, 1994

## ABSTRACT

On December 8, 1993, project Archaeologist Katherine Johnson of the Hopi Cultural Preservation Office (HCPO), conducted a cultural resource inventory of one proposed well site and adjoining pipeline to be constructed by the Office of Environmental Health, Indian Health Service, Hopi Indian Reservation. The inventory has been requested by the Office of Environmental Health and by Mr. Daryl Melvin P.E., Office of Environmental Health, Indian Health Service, the Hopi Tribe.

The Office of Environmental Health is proposing to construct a new well and adjoining pipeline within the eastern lower Mishongnovi area, within District Six, north of and adjacent to State Route 264. The proposed well and pipeline will link up with an existing waterline which parallels State Route 264. This undertaking will involve the use of heavy construction machinery to clear all overburden, trench for both the pipeline and well, and to provide vehicular access to the project area.

The cultural resource inventory identified no cultural materials and no traditional cultural properties or sacred areas. Archaeological clearance is recommended for the proposed construction of the fenceline. If any unanticipated discoveries of cultural resources are made during any phase of the undertaking, the procedures listed within the **Recommendations** portion of this report are to be followed.

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## INTRODUCTION

On December 8, 1993, project Archaeologist Katherine Johnson of the Hopi Cultural Preservation Office (HCPO), Hopi Indian Reservation, Kykotsmovi, Arizona, conducted a cultural resource inventory of a proposed new well and pipeline to be constructed within the eastern lower Mishongnovi area of the District Six portion of the Hopi Indian Reservation (Figure 1). The inventory was requested by the Office of Environmental Health and by Mr. Daryl Melvin, P.E., Office of Environmental Health, Indian Health Service. The proposed well and pipeline are to be constructed in order to bring water service to the residents of the area. The well and pipeline will be constructed within land claimed to be affiliated with the village of Mishongnovi which has given consent to the proposed project.

## DESCRIPTION OF UNDERTAKING

The Hopi Office of Environmental Health is proposing to construct a new well and pipeline within the eastern lower Mishongnovi area of the District Six portion of the Hopi Indian Reservation, Navajo County, Arizona. The proposed project will involve the removal and clearing of natural plant growth and native soils within a 100 foot square area (10,000 square feet, 929 square meters) for the construction and placement of the well with a 30 foot wide (9.1 meters) corridor, of an approximate length of 60 feet (18.28 meters), for the construction and placement of the adjoining pipeline which will link an existing waterline to the proposed well. The well and pipeline construction will entail the use of heavy machinery (e.g., backhoes and front-end loaders). The impacts of the construction are expected to be moderate to intensive. The total area of potential effect for the well area, pipeline and pipeline corridor is: 11,800.0 square feet ( 1095.34 square meters, 0.27 acres, 0.10 hectares ).

## LOCATION

The proposed well and pipeline project area, as defined by the Hopi Cultural Preservation Office, can be located within the eastern lower Mishongnovi area of the District Six portion of the Hopi Indian Reservation, Navajo County, Arizona. The proposed project area is within Township 28 North, Range 17 East and is unplatted. The total proposed project area can be found within the USGS, Polacca, Arizona, 1991 Provisional Edition, 7.5 minute topographic quadrangle, adjacent to and lying north of State Route 264 for an approximate pipeline distance of 60 feet (.01 miles., .018 kilometers) to terminate at the proposed well area (see figures 2 and 3). The proposed well and pipeline will be located east of and below Second Mesa, in the Wepo Wash floodplain, approximately 1.70 miles east of the village of Mishongnovi.

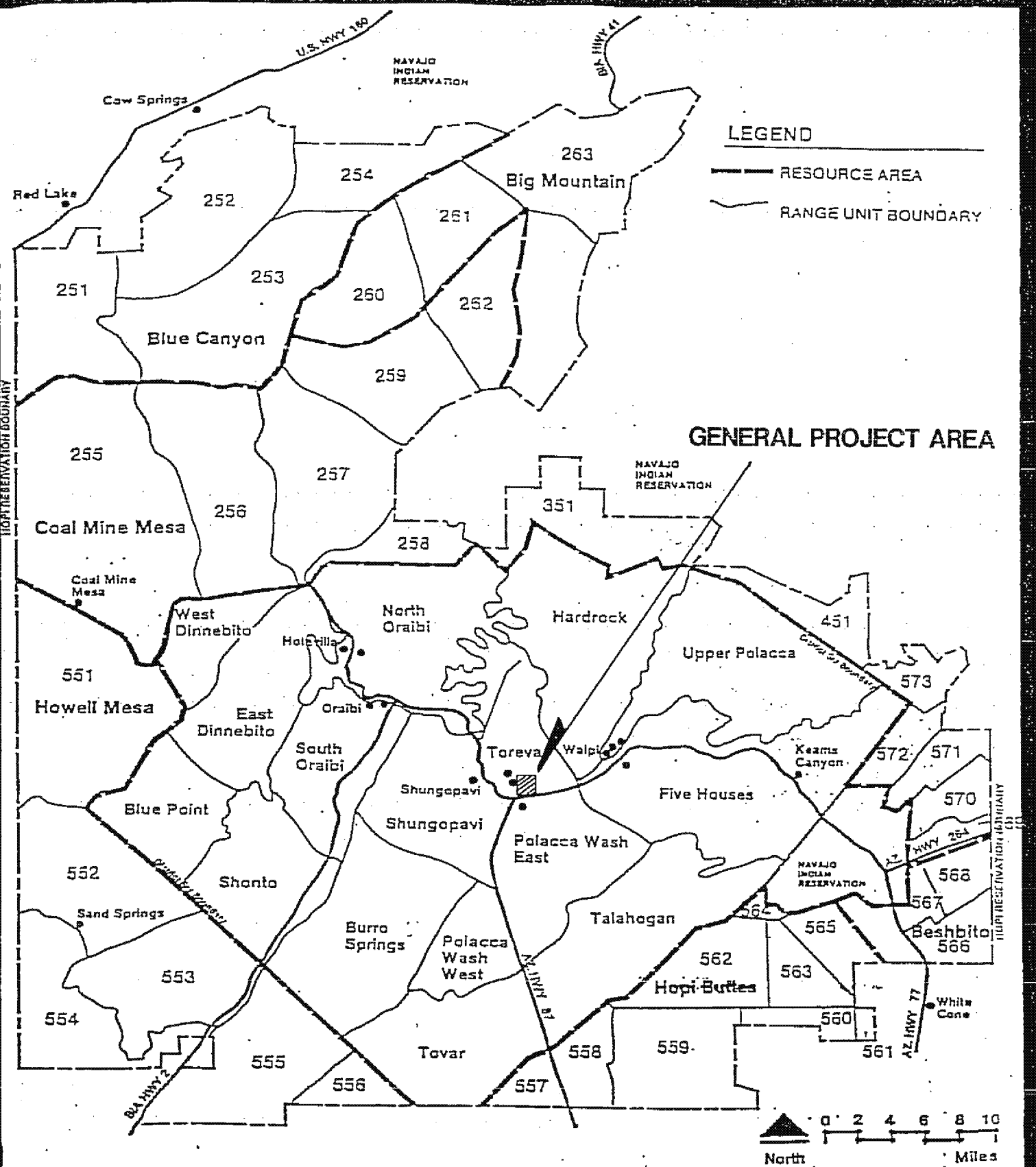


Figure 1. Hopi Resource Areas and Range Units.

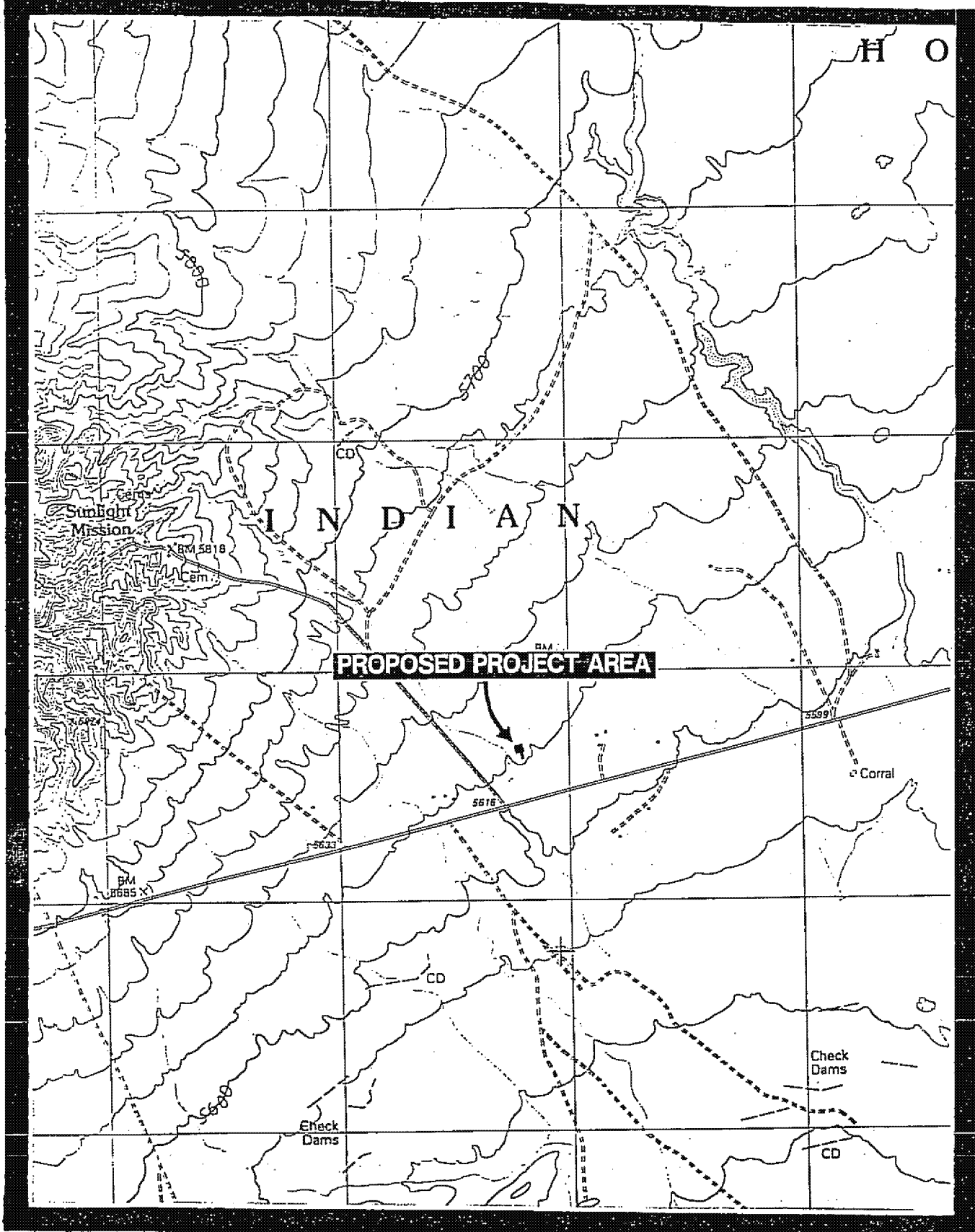


Figure 2. Location of the proposed well and pipeline project area.  
 Hopi District Six, quarter quadrant: QQ 101 SW.  
 USGS, Polacca, Arizona, 1991 Provisional Edition,  
 7.5 minute topographic quadrangle. (HCPO 93-036).

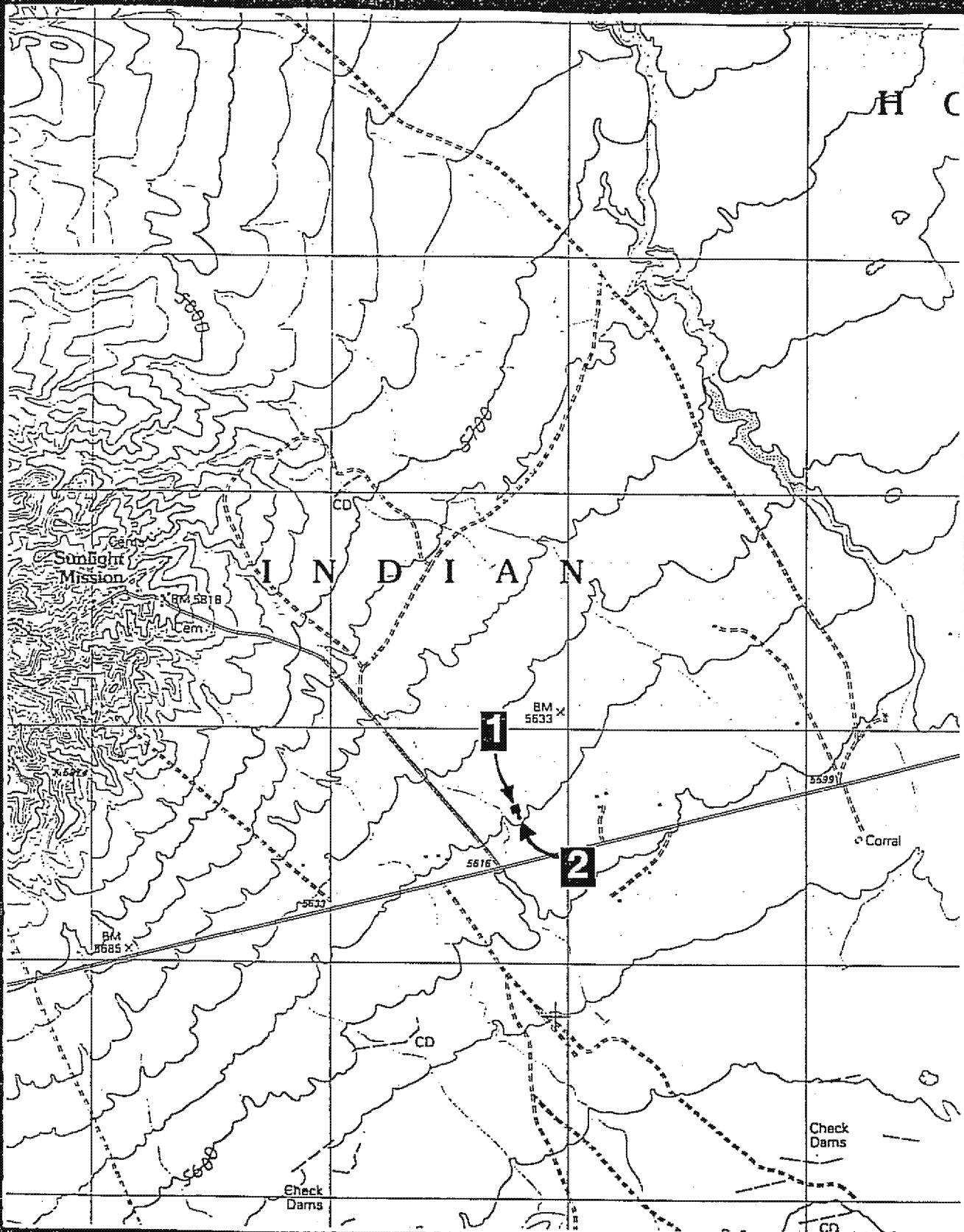


Figure 3. Location of assigned UTM coordinate points for the proposed well and pipeline. Hopi District Six, quarter quadrant: QQ 101 SW. USGS, Polacca, Arizona, 1991 Provisional Edition, 7.5 minute topographic quadrangle. (HCPO 93-036).

Table 1. Assigned UTM coordinate points for the proposed well and pipeline (see Figure 3):

Point	Zone	Northing	Easting
Point No. 1	12	3,961,670	548,770
Point No. 2	12	3,961,620	548,780

#### GENERAL ENVIRONMENT

The following is excerpted from Hays and Alstrom (1991: 27-29).

The Hopi Reservation, including Partitioned Lands, occupies two physiographic zones: the northeastern edge of the Little Colorado Valley and the southern portion of Black Mesa. The Hopi Villages that are occupied today (with the exception of Moenkopi) are on and adjacent to the "Hopi Mesas," three narrow projections from the southern edge of Black Mesa. Thus, the villages may be said to lie along the margin between the two physiographic zones. The Little Colorado Valley is a wide, gently sloping valley running generally from southeast to northwest. The Little Colorado River drains much of northeastern and east-central Arizona, including the Hopi Reservation. Black Mesa is a large plateau that slope from north to south, that is, toward the Little Colorado River. A dominant feature of the Hopi Reservation, at least from the point of view of cultural history, is the Tusayan Washes, a series of long, narrow, northeast-to-southwest trending drainages basins that head on central and northern Black Mesa, separate the Hopi Mesas at the southern edge of Black Mesa, and run across the northern flank of the Little Colorado Valley.

Black Mesa is a "geologic basin" made up of sedimentary rocks dating to the Cretaceous period. These rocks include sandstone and shale, as well as extensive deposits of coal. The adjacent portion of the Little Colorado Valley is underlain by gently sloping sedimentary rocks of the Jurassic and Triassic periods. Together, the valley and the mesa account for the better part of the Mesozoic, from late Triassic to late Cretaceous (Reynolds 1988).

Two kinds of soils commonly found in the area are useful for agriculture: alluvial soils in the valleys and dune sand on the mesa tops and in the valleys. Many of the

clay deposits on the Mesas are of excellent quality for making pottery and for preparing plaster and mortar for architectural purposes. Coal was used domestically and in pottery production, and local sandstone was used for building and making ground stone tools.

Black Mesa acts as a catchment basin for runoff, which is channeled into the Tusayan Washes. Water seeps through permeable layers of the Wepo formation, and runs southward along junctures with impermeable layers, to emerge as springs in various places near the Hopi Villages. Sand dunes on the mesa tops also act to collect water that feeds these springs.

The Hopi Reservation is home to three biotic communities: Great Basin Desertscrub, which is characteristic of the lower slope of the Little Colorado Valley, Great Basin Grassland, which occurs higher on the flank of the Little Colorado Valley on southern Black Mesa, including much of the Hopi Mesas, and Great Basin Conifer Woodland, to be found on Antelope Mesa (one of the easternmost of the Hopi Mesas) and farther north on Black Mesa (Brown and Lowe 1980; Brown 1982). Vegetation in the area probably is somewhat different today than it was before extensive grazing of livestock. Much of the grassland biotic community has been invaded by shrubs, such as saltbush, greasewood, rabbitbrush, and sagebrush. Also, large areas of conifer woodland have recently been chained to remove trees in an attempt to improve grazing. A wide variety of animals were hunted by Hopi ancestors, including antelope, cottontails, and jackrabbits. Deer were probably hunted at some distance from the Hopi Mesas, for example, on northern Black Mesa. Waterfowl are known to have been hunted to the south at Homol'ovi (Szuter 1991).

The Hopi region is arid, and marginal for agriculture. Limited irrigation of terraced gardens is practiced near some springs, but the overwhelming majority of crops are produced by special dry-farming techniques that rely on rainfall and runoff as the only sources of moisture. Hack identifies four kinds of Hopi farming techniques associated with fields in different kinds of locations: ak-chin, flood plain, sand dune, and seepage fields (Hack 1942a:xix).

The survey area can be generally described as being located in Upper Great Basin grassland and semidesert of the Colorado Plateau. The project area is located within the upper reaches of the Wepo Wash floodplain and lies below and east of Second Mesa. Elevation of the area is 5620 feet (1713.0 meters) above sea level with slope and exposure for the entire project area to the south overlooking the Wepo Wash Valley and to the west overlooking Second Mesa.

Indigenous vegetation for the area includes the following:

Bluebunch Wheatgrass	Indian Ricegrass
Buried-stalk Puffball	Mormon Tea
Cholla Cactus	Plains Pricklypear
Common Crupina	Rabbit Brush
Desert Sage	Russian Thistle
Four-wing Saltbush	Thin-leafed Yucca
Gamma Grass	Witchgrass

### CULTURAL SETTING

Developments within range of the proposed project area include the construction of State Route 264, located south of and adjacent to the proposed project area at an approximate distance of 0.01 miles. Existing water lines can also be found within the immediate area as well as new ( H.U.D.) housing developments.

### CULTURE HISTORY

The area comprising the Hopi Reservation has probably been occupied by people for a continuous 2,000 years and the area has probably been inhabited, at least periodically, going back 10,000 to 12,000 years. Archaeological and historical data support this assertion. Hays and Ahlstrom (1991) provide a detailed summary of Hopi prehistory in the Hopi Cultural Resource Inventory, from which this section is excerpted.

The Paleoindian Period (ca. 10,000 to 7000 B.C.) has not been identified on Hopi Reservation lands, but a single Folsom point found near Second Mesa (Gumerman 1966) suggests that the area was at least visited by the mobile hunter-gatherers. Paleoindians seem to have focused on hunting large game animals. Clovis points, dating as early as 10,000 B.C., have been found nearby Kayenta (Ayres 1966) and in the Winslow area (Simms and Daniel 1966). There is, in addition, a poorly known site with Agate Basin points located in the Cow Springs area, immediately northwest of Hopi Partitioned Lands (Nichols and Smiley 1984:90). This site was recorded by MNA in 1971 by Bruce Harrill. It is important to note that this site was discovered after a 3 year drought killed vegetation in a sandy area, and dunes there became active. For a few years, stone tools, debitage and hearths were visible, then the sand covered the site again.

The Desert Culture (ca. 7000 to 500 B.C.) describes the southwest adaptation known as the Archaic Period that follows the Paleoindian Period. In contrast to the Paleoindian, the Archaic peoples hunted small game and gathered a wide variety of plant foods. Flannery refers to the Archaic lifeways as a "broad spectrum" adaptation. The change in lifeways was preceded by, or took place in concert with, changes in climate and in fauna. Most

of the continent became warmer and drier about 10,000 years ago, and many of the large game animals became extinct.

Few sites that can be positively dated to this period have been located on Hopi land. This gap in the chronology of known sites probably reflects a gap in research, and not a hiatus in the occupation of the Reservation. Archaic sites have, for example, been recorded to the south in the Little Colorado River Valley (Simms and Daniel 1967; Wendorf and Thomas 1951; Longacre 1970) and at least one on Black Mesa (Nichols and Smiley 1984:92-39).

Archaic sites are generally difficult to find because they lack the kinds of materials and features that make later sites highly visible on the surface. Architecture was very simple and ephemeral during this period, because people practiced a nomadic economy. The predominant features on Archaic sites are hearths, and the only artifacts found are chipped and groundstone tools.

Following the Archaic period is the Basketmaker II (ca. 500 B.C. to A.D. 500) period, which is characterized by peoples who practiced limited cultivation of corn and squash, but did not produce pottery. They probably moved seasonally, because they still relied on hunted and gathered resources. They lived at least part of the year in pithouses. These pithouses were not clustered in permanent settlements. Rockshelters, where available, were favored for habitation in some seasons.

Basketmaker II sites are typified by the presence of characteristic projectile points, by slab-lined storage cists, and by the absence of ceramics.

The beginning date for maize cultivation in the Hopi Mesa area is currently a source of much debate. Until recently, the earliest known maize in this area was dated to about 100 B.C. Remains from the Kayenta sites of White Dog Cave and Kidder and Guernsey Caves 1 and 2 were re-dated using new C-14 techniques, and yielded dates of about 500 B.C. Excavation of a rockshelter on the North Rim of Black Mesa, Three Fir Shelter, yielded dates on maize as early as 800 B.C., although the overwhelming majority of dates from the site fell into a range spanning about 200-100 B.C. (Smiley and Parry 1990). For now, a beginning date of 500 B.C. is accepted for the advent of maize cultivation, and thus the beginning of the Basketmaker II period, but it is possible that earlier dates will soon be generated.

The Basketmaker III period (A.D. 500-750) is characterized by a more heavy reliance on agricultural subsistence and the introduction of year round pithouse habitation. Pithouses of this period are larger than before, and families often gathered together in pithouse communities or villages. Beans were added as an agricultural product. Turkeys were also domesticated, but their use appears more as a source of feathers in the production of blankets and other items, rather than as food. The bow and arrow was added



to the technology of hunting. Ceramics consisted of plain gray wares and occasional vessels decorated with simple black designs. Sites are recognized by the presence of pithouse depressions, slab-lined cists, and plain gray pottery. Fifty-eight such sites have been located and recorded on the Hopi reservation, and 38 of these are in the vicinity of the Hopi Mesas, including Antelope Mesa.

One Basketmaker III site, Jeddito 264, on the Hopi Mesas was excavated as part of the Peabody Museum's Awatovi Expedition and the results published (Daifuku 1961). Jeddito 264 contained six pithouses and 43 storage pits. The structures at the site probably reflect two occupations, or two construction episodes in a site that was used for a long period of time in the late 600s and early 700s. In the early occupation, pithouse inhabitants constructed scattered and clustered cists for storage. In the late occupation, one pithouse was accompanied by an arc of small, contiguous surface rooms that were used for storage.

The Pueblo I period (A.D. 750-1000) is defined by the change from pithouse to surface architecture in most areas, and by the appearance of polished black-on-white pottery and neck-banded gray pottery. This transition begins as early as A.D. 700 in some areas, for example, in the Chaco Canyon area, and as late as A.D. 800 in others. Pithouses continue to be used in many areas, for example, the Hopi Buttes and Homol'ovi areas (Gumerman 1988, Young 1987). Population increases both on the Hopi Mesas and on Northern Black Mesa. People began to use above-ground storage rooms, and gradually moved from pithouses to surface rooms, although, as noted, pithouses persist in some areas.

The Pueblo II period (A.D. 1000-1150) witnesses a continued increase in population. Some people lived in small pueblos scattered about on tops of the Hopi Mesas and northern Black Mesa. Pueblo II sites recorded on Hopi land are more numerous than any other time category (401 sites have been previously recorded). Many of these pueblos have formalized designs consisting of blocks of surface masonry rooms with kivas in front of the rooms. Trash is usually deposited in middens nearby. One of the few excavated and published Pueblo II unit pueblos on Hopi land is the Little Kiva Site, AZ J:6:1 (ASU) (Rice 1986). The early component, at least, at this site dates to Pueblo II and includes a kiva, a mealing room, two masonry rooms, and a couple of jacal surface rooms.

Archaeologists usually think of unit pueblos like the Little Kiva Site as typical of the Pueblo II period, although there is a great deal of variation. Some people continue to live in pithouses at this time. An example is Jeddito Site 111 (Smith 1972:147-155), located about 2.5 miles northeast of Awatovi. This site dates to late Pueblo II, in the eleventh century. Harvard Peabody excavators determined that it contained at least six scattered, unconnected semisubterranean and subterranean rooms and three or four scattered pits and fireplaces. The structures contained no masonry, and

probably had jacal superstructures. Two structures were rectangular, one was round, and three had more complex shapes, and may have been kivas.

On and near the Hopi Mesas, during Pueblo III (A.D. 1150-1300) times, the villages continued to grow. A wide variety of kiva forms are found, including round, D-shaped, and rectangular. Tree-ring evidence suggests that D-shaped kivas were more common in the 1200s (Ahlstrom 1985). The Hopi-style kiva, a rectangular structure with a raised platform at one end, had appeared by A.D. 1300 (Smith 1972; Ahlstrom 1985; Adams 1991). In addition to the continuation of the black-on-white ceramic tradition, orange pottery with designs in black, white, and red became very common (see Smith 1971). Three hundred thirty-six sites with Pueblo III occupations have been recorded on the Hopi Reservation. Only a very small number of these have been excavated.

Jeddito Site 108 is a small Pueblo II-Pueblo III period village on Antelope Mesa, about half-way between Awatovi and Kawaika'a (Smith 1972). It had about 9 rectangular surface masonry rooms and a semi-subterranean D-shaped kiva. The kiva had been partly dug into the soft sandstone bedrock, and its upper walls were masonry. It contained a hearth, deflector, and ventilator complex, with a wall niche, bench, and small holes in the floor were probably used to anchor looms. One small hole near the hearth may have represented the Sipapu.

The Pueblo IV period (A.D. 1300-1629) can be usefully broken down into three parts. The fourteenth century was a period of rapid population growth on the Hopi Mesas. The primary cause of growth was immigration from the Little Colorado River Valley, the Kayenta area, and probably from many other areas as well. Very large pueblos were built on the Hopi Mesas and nearby to the south, at Homol'ovi and Bidahochi, for example. Most of these pueblos have rectangular, enclosed plazas, containing rectangular kivas. Small field house sites also occur at this time. 184 sites used during this time period have been recorded on and near the Hopi Mesas.

The advent of katsina religion at this time is reflected in ceramics, kiva murals, rock art, and painted stone slabs (Adams 1989, 1991; Hays 1989; Cole 1989). The appearance of yellow-ware ceramics defines the beginning of this period. Many vessels were probably produced by specialists. Coal mines and pottery firing areas were extensive (Colton 1936; Hack 1942; Powers 1976). Hopi pottery was traded extensively from 1300 to about 1400 or 1450. Trade dropped off after that time, but decorative style continued to become more elaborate.

The late 1400s and early 1500s represent a gap in reliable data. The "type site" for this period is Sikyatki - because most of the pottery from this site places it later than the early 1400s, and it was known to have been abandoned before the arrival of the

Spaniards in the mid-1500s. However, Sikyatki was not systematically excavated. Data exist from systematic excavations at Awatovi and Kawaika'a, but have not yet been analyzed and compiled to produce any useful documentation of this period.

The historic period at Hopi began with the arrival of Coronado in the Southwest in 1540. After a violent start the Spanish finally "pacified" the Hopi in 1598 when Onate received their submission to royal authority. Spanish influence grew with the establishment of missions at Awatovi and Oraibi in 1628 and 1629.

Spanish presence at Hopi decreased after the Pueblo Revolt in 1680. At that time missionaries were killed and churches destroyed, in response to harsh treatment from the Spanish. Spanish influence continued to diminish until their withdrawal from sovereignty in the Southwest with the 1823 Mexican Revolt. Before their fall from power in the Southwest, the Spanish introduced the Hopi to sheep, goats, horses, burros, peaches, onions, chili peppers, watermelon, and other garden crops, thus altering the traditional Puebloan economy.

The aftermath of the Pueblo Revolt was a time of upheaval on the Hopi Mesas. Many people sought refuge from Spanish reprisals atop the mesas. The village of Shungopavi moved to its present location at this time on top of Second Mesa. People from the Rio Grande Valley moved to Hopi and settled villages such as Hano, located next to Sichomovi on First Mesa.

The eighteenth and nineteenth centuries at Hopi were marked by the movement of Navajo bands into the area. This often hostile presence made it difficult for the Hopi to communicate with outside pueblos. In 1860 the Navajo were removed by the American Government. Shortly thereafter trading posts and an Indian Agency were established in Hopi Country. Manufactured goods and raw materials became more accessible to the Hopi.

The villages of Kykotsmovi and Polacca were established in the early 20th century, a time during which many people moved off of the mesa tops to the vicinity of schools, trading posts, and water sources. At the same time, Oraibi split in 1906 which resulted in the establishment of Hotevilla and Bacavi and the growth of Moenkopi. Finally, the partitioning of the former Joint Use Area has opened some new land to Hopi settlement and eliminated other land formerly open to the Hopi.

## PREVIOUS RESEARCH RESULTS

A review of the Hopi Cultural Preservation Office site and project records revealed that no sites have been previously recorded within a 1 kilometer radius of the proposed project area.

## SURVEY METHODOLOGY

On December 8, 1993, project Archaeologist Katherine Johnson of the Hopi Cultural Preservation Office, visited the proposed project location, east of Second Mesa, within the lower Mishongnovi area of the District Six portion of the Hopi Reservation in order to survey an established boundary and corridor for a proposed well and pipeline route established by the Hopi Office of Environmental Health. The proposed pipeline route is an approximate distance of 60 feet (18.28 meters) from end to end with a corridor width of 30 feet (9.10 meters).

The total area was surveyed for any archaeological, historical or recognizable Traditional Cultural Properties (TCP's). Pedestrian traversed transects across the entire proposed well area were examined by the project archaeologist while walking at approximate 5 meter interval lengths across the established well area boundary. The proposed pipeline corridor was examined in the same fashion for the entire length and area. During survey of the entire proposed project area, recordation of all findings within the boundaries were performed. Total potential area of affect for this project is: 11,800.0 feet square (1095.34 meters square, 0.27 acres and 0.10 hectares).

## CULTURAL RESOURCE FINDINGS

The cultural resource inventory for the entire proposed well and pipeline corridor project identified no archaeological sites and no register eligible traditional cultural properties or sacred places.

### Traditional Cultural Property Consultation

Consultation and discussion with Hopi Cultural Preservation Office Research Assistants Lee Wayne Lomayestewa and Ambrose Namoki, knowledgeable in Hopi religious and sacred practices concerning traditional cultural property locations within the area of the proposed project, revealed that no traditional cultural or sacred properties would be affected by this undertaking.

### RECOMMENDATIONS

Unconditional archaeological clearance is recommended for the proposed construction of the well and pipeline provided the stipulations given below are followed.

The procedures listed below should be strictly adhered to in order to minimize the potential for impacts should unanticipated cultural resources be encountered. Specifically, all activities utilizing mechanized equipment, including travel, should be limited to within the defined project boundaries, or on existing roads. In the event that archaeological features are encountered during any phase of dismantling, all dismantling shall cease within 100 ft. (30 M.) radius until the Hopi Cultural Preservation Office has been notified and a tribal Archaeologist has the opportunity to evaluate the findings. If the findings are evaluated as sensitive by the monitoring HCPO archaeologist, the procedures listed below will be followed. If the findings by the monitoring archaeologist indicate negative sensitivity, well and pipeline construction may continue as planned.

In the event of an unanticipated discovery, the HCPO Archaeologist will survey the existing ground surface in the vicinity of the discovery. All cultural findings will be mapped to show the relationship of the discovery to the project area (including nearby points of intersection), topographic features, cultural features and surface artifacts. The map will be prepared using, at a minimum, a compass and measuring tape; at the option of the archaeologist, other surveying equipment may be employed. All features will be profiled in cross-section (if possible) and photo-documented. An evaluation of the Register Eligibility will be made and the SHPO and ACHP notified for consultation.

In the event that burials are encountered, an initial assessment of the extent of disturbance will be made by the archaeologist. Procedures will be implemented to resecure the burial and all subsequent activities associated with the undertaking will cease in the area of the burial until the appropriate Hopi and other appropriate Native American Tribes can be notified for NAGPRA consultation.

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*Memorandum  
of  
Agreement*

MEMORANDUM OF AGREEMENT  
AMONG  
THE INDIAN HEALTH SERVICE  
AND  
MISHONGNOVI VILLAGE  
AND  
THE HOPI TRIBE  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA  
PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE  
PHOENIX AREA OFFICE

JULY 1993

MEMORANDUM OF AGREEMENT  
AMONG  
THE INDIAN HEALTH SERVICE  
AND  
THE HOPI TRIBE  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO: PH 93-779  
PUBLIC LAW 86-121

DATE OF AGREEMENT:  
July 1993

THIS AGREEMENT is made among the Indian Health Service, acting through the Director, Phoenix Area Indian Health Service, hereinafter referred to as IHS, Department of Health and Human Services (HHS), under and pursuant to the provisions of Public Law 86-121 (73 Stat. 267); Village of Mishongnovi, hereinafter referred to as the Village, acting through the Chairman of the Mishongnovi Village Cultural Preservation Board; and the Hopi Tribe of the Hopi Indian Reservation, hereinafter referred to as the Tribe, acting through the Chairman of the Hopi Tribe.

WHEREAS, the Tribe desires to obtain satisfactory water supply facilities for the Village of Mishongnovi on the Hopi Indian Reservation, and

WHEREAS, the Tribe, acting through the Chairman, submitted a project proposal to the IHS, dated January 22, 1993, requesting assistance under Public Law 86-121 in the construction of water supply facilities for the Village of Mishongnovi, and

WHEREAS, the IHS desires to assist in the construction of water supply facilities for the Village of Mishongnovi on the Hopi Indian Reservation, Navajo and Coconino Counties, Arizona, as a means of improving the health of the residents, and

WHEREAS, the Tribe has reviewed and concurs with the provisions of the Project Summary.

NOW THEREFORE, in order to carry out the project as set forth in the attached Project Summary entitled "...Mishongnovi Well, Hopi Indian Reservation...", and dated July 1993, the parties mutually agree that:

TRIBAL LANDS

1. The IHS recognizes the special relationship between the Hopi Tribe, Hopi Villages, and Hopi Clans. Further, while IHS sees the Hopi Tribe as the focal point for agreements such as this, IHS respects the autonomy of the Villages and realizes that Village and/or Clan approval is often necessary prior to entering upon Hopi lands.
2. The Tribe and Village hereby grant permission for IHS and its representatives to enter upon or cross Tribal and

Village lands for the purpose of carrying out the project outlined in the Project Summary and provided for in this Agreement and further agree to waive all claims which may arise by reason of such entry upon these lands, except those that may be recognized under the Federal Tort Claims Act. Facilities will be located in areas acceptable to the Village.

3. The Tribe and Village will obtain all rights-of-way on or over Tribal and Village lands as in the judgment of the Tribe, Village and IHS may be necessary for the provision and operation of any facilities provided for hereunder and waives any claims for compensation and damages therefore, except those that may be recognized under the Federal Tort Claims Act.
4. The Tribe and Village will provide without charge to the IHS all Tribal and Village land necessary for the construction of the facilities as provided for in the Project Summary.

#### HOMES SERVED

5. The Tribe and Village shall provide technical assistance to the participants to be served under this project. IHS will, to the extent of scheduling and economic feasibility, attempt to serve each participant. All homes must be found to meet eligibility and feasibility criteria established by the IHS.
6. The IHS responsibility ends at a point five (5) feet outside the home. IHS will connect to the home system if present at the time of construction. Homes must be adequately winterized prior to IHS service.
7. The IHS shall notify the Tribe and Village on whether individual participants and sites qualify for sanitation facilities, noting the deficiencies of those not qualifying.
8. If additional participants are to be served, a letter amendment to this Agreement is required by IHS, Tribe and the Village prior to any additional construction. This amendment will describe the numbers and types of additional services to be provided, and the maximum additional contribution, if any, to be made by IHS.
9. The IHS reserves the right to cancel the project or portion thereof should an insufficient number of eligible homeowners be available for water and sewer services. This decision would not be made without Tribal and Village consultation.

#### IHS CONTRIBUTIONS

10. The IHS will provide without charge to the Tribe:
  - a. Technical assistance with contract administration construction inspection, supply and materials purchase, construction staking (if applicable), and the preparation of plans and specifications;
  - b. All materials, supplies, equipment, and labor for the installation of the facilities as provided for in the attached Project Summary, and not otherwise provided for in this Agreement; and
  - c. The instructions as to the proper utilization, maintenance, operation, and protection of the facilities provided for herein.

#### REPRESENTATIVES

11. The Tribe and/or Village will provide one or more representatives to coordinate the conduct of tribal participation under this Agreement, including active promotion of attendance of Indian beneficiaries at meetings and attendance at the final inspection.
12. The IHS Project Engineer shall coordinate IHS participation in the Project.

#### TRANSFER OF FACILITIES

13. In consideration of the contributions made and the responsibilities undertaken herein by the Tribe and/or Village, upon completion of the project, the IHS will transfer all rights, title, and interest to the appropriate authority without charge, the community facilities including all rights-of-way, materials, supplies, and equipment provided and incorporated therein pursuant to this Agreement.
14. When the community facility or each operational unit of the community facility is completed, it will be inspected by the IHS, the Tribe, Village and operator to detect possible construction deficiencies. A punch list of these deficiencies, if any, will be compiled and agreed upon. These deficiencies will be corrected by the responsible construction agency. At that time, a final inspection of the facility or operational unit of the facility will be made. When acceptable to all parties, ownership of the facility or operational unit will be transferred to the appropriate authority and it will be placed into operation so as to provide services to the consumer. When operation

commences, the operation and maintenance of the facility will become the responsibility of the appropriate authority.

15. The Tribe and/or Village hereby agree to accept the transfer of such functional community facilities and to operate, properly and efficiently maintain, and to repair said facilities and equipment as the property of the Tribe and/or Village so as to keep them in an effective and operating condition.
16. In consideration of contributions made and the responsibilities assumed herein by the Tribe and/or Village and the individual Indian residents, upon completion of the project, the IHS will transfer to the head of each Indian household, without charge, the individual facilities and appurtenances provided for in this Agreement, and the head of each household will thereafter be responsible for the maintenance and repair of such individual facilities as his own property so as to keep them in an effective and operating condition. Punch list and final inspections will be held prior to transfer with appropriate Tribal, Village, IHS and individual representatives.

#### OPERATION AND MAINTENANCE FEES AND ORDINANCES

17. The Tribe and Village will support the appropriate utility authority in enforcing utility ordinances for connection fees and user rates and collect such charges from individuals served by the system as are necessary to sustain the operation, maintenance, and repair of the community water supply and sewerage systems.
18. The Tribe, Village and appropriate utility authority agree to enact and enforce appropriate ordinances or regulations governing:
  - a. Connection to the community water supply and sewage systems by the residents of the Mishongnovi and Sipaulovi Communities;
  - b. The methods and materials to be used in making connections to the community water supply and sewage systems in a safe and sanitary manner; and
  - c. The continued operation, maintenance, and repair of individual water supply and waste disposal facilities in a safe and sanitary condition by the persons served thereby.

#### PROJECT SCHEDULE

19. It is important that the installation of the water supply

facilities provided for herein be completed as soon as is practicable in accordance with the schedule of work with priorities as agreed to by the Tribe, Village and IHS project engineer.

20. In the event that actual construction of this project cannot be initiated for any reason by May 1994, the IHS reserves the right to cancel the project and use the designated project funds for other projects which lack impediments to prompt construction. If the condition which impeded construction is resolved following such cancellation, the IHS will give high priority to funding the project from appropriated sanitation facilities funds available at the time or from future appropriations for sanitation facilities.

#### WARRANTIES

21. The IHS, to the extent economically feasible, will obtain a one year warranty for the Tribe, Village, and head of household from the IHS contractors, suppliers, and manufacturers on equipment, work, and supplies provided by them. The IHS shall assist the Tribe, Village or head of household in obtaining the benefits and protection of all warranties on equipment or work provided under this Agreement. In the event of a problem occurring within the first year of installation with the design or construction of IHS force account installed facilities, equipment, or work not protected by the warranties of the suppliers or manufacturers, the IHS will correct the problem, subject to the availability of funds and staff resources, as determined by the IHS. IHS will give warranty work the highest priority and promptly notify the Tribe, Village, and/or homeowner of delays and reasons for such.

#### AGREEMENT DISPUTES

22. The parties to this Agreement agree to resolve all disputes regarding the provisions of this Agreement among the parties through administrative procedures first. If a dispute cannot be resolved locally, the parties to this Agreement agree that the next administrative procedure is an appeals board established at the IHS headquarters level, which will make a recommendation to the IHS Director, who will exercise final authority for the IHS in the administrative review of all disputes.

#### AGREEMENT TERMINATION

23. Any party to this Agreement may terminate its relationship with the other Agreement parties prior to project completion upon 30 days notice in writing to all other parties.

IN WITNESS WHEREOF, the parties have subscribed their names:

FOR THE TRIBE:

10/29/93  
Date

Verna Mayesova  
Chairman, Hopi Indian Tribe, having been  
duly authorized to enter into this  
Agreement on behalf of the Hopi Tribe,  
as evidenced by the attached copy of the  
resolution made by the Hopi Tribal  
Council

FOR MISHONGNOVI VILLAGE

7-13-93  
Date

Boat Puhagasa Tawa  
Chairman  
Mishongnovi Village Cultural  
Preservation Board

FOR THE INDIAN HEALTH SERVICE:

9/8/93  
Date

Mary L. Stutz  
Area Director  
Phoenix Area Indian Health Service  
Department of Health and Human Services



HOPI TRIBAL COUNCIL  
RESOLUTION  
H-168-93

WHEREAS, the Hopi Tribe desires to obtain satisfactory water supply and sewage disposal facilities for new houses to be constructed throughout the Reservation; and

WHEREAS, the Hopi Tribe request assistance under Public Law 86-121 in obtaining water supply and sewage disposal facilities for the Indian families that will be occupying the homes in the Village of Mishongnovi; and

WHEREAS, the Indian Health Service desires to help provide satisfactory water supply and sewage disposal facilities for those residents; and

WHEREAS, a Memorandum of Agreement has been reviewed in open session of the Hopi Tribal Council to provide the necessary services from the Indian Health Service to the Hopi Tribe and the Village of Mishongnovi.

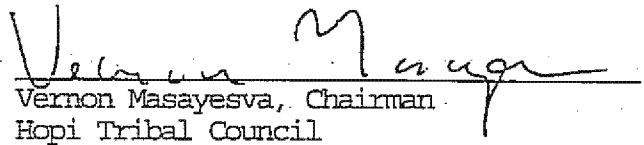
NOW THEREFORE BE IT RESOLVED that the Hopi Tribal Council hereby approves the implementation of Indian Health Service Project No. PH-93-779.

BE IT FINALLY RESOLVED that the Chief Executive Officer or his designee is hereby authorized to enter into this Memorandum of Agreement and all subsequent agreements pertaining to the construction and transfer of Indian Health Service Project 93-779 on behalf of the Hopi Tribe.

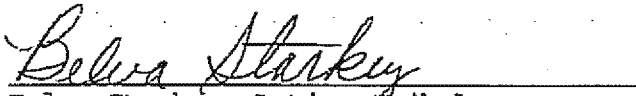
HOPI TRIBAL COUNCIL  
RESOLUTION  
H-168-93

C E R T I F I C A T I O N

The foregoing resolution was duly adopted by the Hopi Tribal Council on October 25, 1993, at a meeting at which a quorum was present with a vote of 10 in favor, 2 opposed, 4 abstaining (Chairman presiding and not voting) pursuant to the authority vested in the Hopi Tribal Council by Section 1(a) of Article VI of the Hopi Tribal Constitution and By-Laws of the Hopi Tribe of Arizona, as ratified by the Hopi Tribal Council on October 24, 1936, and approved by the Secretary of the Interior on December 19, 1936, pursuant to Section 16 of the Act of June 18, 1934. Said resolution is effective as of the date of adoption and does not require Secretarial approval.

  
Vernon Masayesva, Chairman  
Hopi Tribal Council

ATTEST:

  
Belva Starkey, Acting Tribal Secretary  
Hopi Tribal Council



## MISHONGNOVI COMMUNITY OFFICE

MISHONGNOVI VILLAGE

RESOLUTION #002-93

MISHONGNOVI VILLAGE

HOPÍ INDIAN RESERVATION

WHEREAS, the Indian Health Service has agreed with the Hopi Tribe to install a new water source controls and interconnection for a domestic water supply facility for Indian residents of the community of Mishongnovi, Hopi Indian Reservation, Arizona, Project No. PH 93-779; and

WHEREAS, the Indian Health Service has requested an agreement between the IHS, Hopi Tribe and the Village of Mishongnovi with the approval and support of the people of Mishongnovi Village; and

WHEREAS, the Indian Health Service shall obtain all rights-of-way on or over clan and/or the individual land with the village assisting to secure approval prior to the construction of the water source, controls and interconnection for a domestic water supply facility provided for hereunder; and

WHEREAS, the Village hereby grants permission for the IHS and its representatives to enter upon or cross interest lands for the purposes of carrying out the project outlined in the Project Summary; and

WHEREAS, the Village desires and requests the support of the President of the Mishongnovi Cultural Preservation Board to approve the construction of a domestic water supply facility project for Indian homes in Mishongnovi community; and

WHEREAS, the Village understands the operation and maintenance of this sanitation facility is the sole responsibility of the Cultural Preservation Board and/or individuals' receiving such facilities, and that after construction is completed, the Cultural Preservation Board will accept the transfer of the facilities from the IHS to the Cultural Preservation Board, and

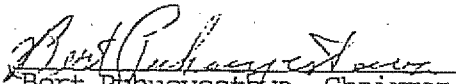
Mishongnovi Village  
Resolution #002-93  
IHS Project  
Page 2

NOW THEREFORE BE IT RESOLVED, that the President of the Mishongnovi Cultural Preservation Board recommends to the Tribal Council to execute the Memorandum of Agreement and all subsequent agreements pertaining to the construction and transfer of this project with the Indian Health Service on behalf of the Mishongnovi Cultural Preservation Board.

C E R T I F I C A T I O N

The foregoing Resolution was duly adopted on March 25, 1993  
by a vote of 8 for and 0 against by the Mishongnovi Cultural Preservation Board. Said resolution is effective as of the date.

March 25, 1993  
Date

  
Bert Puhueyestewa, Chairman  
Cultural Preservation Board

AMENDMENT NO. 1  
TO THE  
MEMORANDUM OF AGREEMENT  
BETWEEN  
THE INDIAN HEALTH SERVICE  
AND  
MISHONGNOVI VILLAGE  
AND  
THE HOPI TRIBE  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
INDIAN HEALTH SERVICE  
PHOENIX AREA OFFICE

DECEMBER 1994

AMENDMENT NO. 1  
TO THE  
MEMORANDUM OF AGREEMENT  
BETWEEN  
THE INDIAN HEALTH SERVICE  
AND  
MISHONGNOVI VILLAGE  
AND  
THE HOPI TRIBE  
HOPI INDIAN RESERVATION  
NAVAJO AND COCONINO COUNTIES, ARIZONA

PROJECT NO. PH 93-779  
PUBLIC LAW 86-121

DATE OF AMENDMENT:  
December 1994

WHEREAS, the Indian Health Service, hereinafter referred to as the IHS, acting under and pursuant to Public Law 86-121 (73 Stat. 267); Village of Mishongnovi, hereinafter referred to as the Village, acting through the Chairman of the Mishongnovi Village Cultural Preservation Board; and the Hopi Tribe, hereinafter referred to as the Tribe, acting through the Chairman of the Hopi Tribe, entered into an agreement executed for the IHS on September 8, 1993, signed for the Village on July 13, 1993, and signed for the Tribe on October 29, 1993, regarding the provision of sanitation facilities for residents of the Village of Mishongnovi on the Hopi Indian Reservation, and

WHEREAS, since the original Agreement was approved, the Tribe and IHS have entered into a Memorandum of Understanding (MOU), dated August 1994, to provide for Tribal Force Account construction of Public Law 86-121 projects on the Reservation for the next five years, and

WHEREAS, the IHS and Tribe desire to incorporate the provisions of the MOU in Project PH 93-779.

NOW THEREFORE, in order to incorporate the provisions of the MOU into the aforesaid project and provide for Tribal Force Account Construction, the parties mutually agree that:

**MOA REVISIONS**

1. The MOU approved by the IHS and Tribe in August 1994 is hereby incorporated by reference into the MOA for Project PH 93-779. The MOU provides for construction by means of Tribal Force Account.
2. The IHS shall contribute to the Tribe an amount not to exceed \$40,000 for administration and construction of the proposed facilities in accordance with the MOU. The IHS Area Director may increase this amount subject to the availability of funds, and will notify the other parties in writing of any changes.

3. The date for conclusion of the agreement stated in Paragraph 20 of the original MOA is hereby changed to July 31, 1996.

#### GENERAL PROVISIONS

4. In case of any conflict between the intent and meaning of similar paragraphs contained in the original MOA and MOU, the intent and meaning of the MOU shall control.
5. All other sections of the original MOA, as amended, shall remain in effect as agreed upon and executed.

IN WITNESS WHEREOF, the parties have subscribed their names:

FOR THE HOPI TRIBE:

January 3, 1995

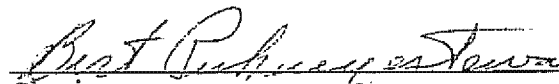
Date

  
Chairman, The Hopi Tribe

FOR MISHONGNOVI VILLAGE

January 12, 1995

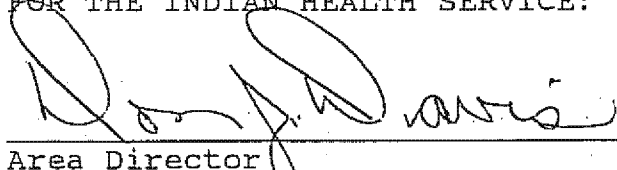
Date

  
Chairman  
Mishongnovi Village Cultural  
Preservation Board

FOR THE INDIAN HEALTH SERVICE:

1.23.95

Date

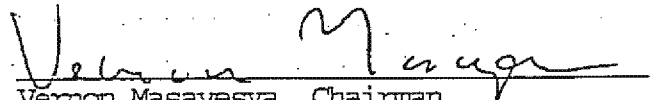
  
Area Director  
Phoenix Area Indian Health Service  
Department of Health and Human Services



HOPI TRIBAL COUNCIL  
RESOLUTION  
H-168-93

C E R T I F I C A T I O N

The foregoing resolution was duly adopted by the Hopi Tribal Council on October 25, 1993, at a meeting at which a quorum was present with a vote of 10 in favor, 2 opposed, 4 abstaining (Chairman presiding and not voting) pursuant to the authority vested in the Hopi Tribal Council by Section 1(a) of Article VI of the Hopi Tribal Constitution and By-Laws of the Hopi Tribe of Arizona, as ratified by the Hopi Tribal Council on October 24, 1936, and approved by the Secretary of the Interior on December 19, 1936, pursuant to Section 16 of the Act of June 18, 1934. Said resolution is effective as of the date of adoption and does not require Secretarial approval.

  
Vernon Masayesva, Chairman  
Hopi Tribal Council

ATTEST:

  
Belva Starkey, Acting Tribal Secretary  
Hopi Tribal Council



## MISHONGNOVI COMMUNITY OFFICE

MISHONGNOVI VILLAGE  
RESOLUTION #002-93

MISHONGNOVI VILLAGE  
HOPI INDIAN RESERVATION

WHEREAS, the Indian Health Service has agreed with the Hopi Tribe to install a new water source controls and interconnection for a domestic water supply facility for Indian residents of the community of Mishongnovi, Hopi Indian Reservation, Arizona, Project No. PH 93-779; and

WHEREAS, the Indian Health Service has requested an agreement between the IHS, Hopi Tribe and the Village of Mishongnovi with the approval and support of the people of Mishongnovi Village; and

WHEREAS, the Indian Health Service shall obtain all rights-of-way on or over clan and/or the individual land with the village assisting to secure approval prior to the construction of the water source, controls and interconnection for a domestic water supply facility provided for hereunder; and

WHEREAS, the Village hereby grants permission for the IHS and its representatives to enter upon or cross interest lands for the purposes of carrying out the project outlined in the Project Summary; and

WHEREAS, the Village desires and requests the support of the President of the Mishongnovi Cultural Preservation Board to approve the construction of a domestic water supply facility project for Indian homes in Mishongnovi community; and

WHEREAS, the Village understands the operation and maintenance of this sanitation facility is the sole responsibility of the Cultural Preservation Board and/or individuals' receiving such facilities, and that after construction is completed, the Cultural Preservation Board will accept the transfer of the facilities from the IHS to the Cultural Preservation Board, and

Mishongnovi Village  
Resolution #002-93  
IHS Project  
Page 2

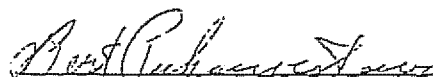
NOW THEREFORE BE IT RESOLVED, that the President of the Mishongnovi Cultural Preservation Board recommends to the Tribal Council to execute the Memorandum of Agreement and all subsequent agreements pertaining to the construction and transfer of this project with the Indian Health Service on behalf of the Mishongnovi Cultural Preservation Board.

C E R T I F I C A T I O N

The foregoing Resolution was duly adopted on March 25, 1993  
by a vote of 8 for and 0 against by the Mishongnovi Cultural Preservation Board. Said resolution is effective as of the date.

March 25, 1993

Date

  
Bert Puhueyestewa, Chairman  
Cultural Preservation Board

